FIELD CROP ABSTRACTS

VOL. 4, NOS. 1, 2, 3 and 4

1951

Published by the
COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS
ABERYSTWYTH, GREAT BRITAIN

FIELD CROP ABSTRACTS

VOL. 4, 1951

SUMMARY OF CONTENTS

FIELD CROPS:

PAGES

Cereals 1, 49, 105, 151
Legumes 14, 64, 119, 164
Roots 18, 67, 120, 167
Fibres 22, 71, 123, 168
Oil Crops 25, 73, 128, 172
Other Crops 27, 73, 129, 174
LAND USE, SURVEYS and MANAGEMENT 27, 73, 129, 174
FARMING SYSTEMS and PRACTICES 29, 75, 130, 175
SOIL and WATER CONSERVATION 31, 77, 131, 176
WEEDS and WEED CONTROL 33, 77, 131, 176
CROP BOTANY 36, 81, 134, 184
MISCELLANEOUS 40, 87, 141, 190
REVIEWS and REPORTS 41, 89, 143, 191
NEWS ITEMS and NOTES 48, 102, 149, 197
ANNUAL INDEX OF SUBJECTS 199
ANNUAL INDEX OF AUTHORS 229

COMMONWEALTH INST.
ENTOMOLOGY LIBRARY
21 JAN 1952
SERIAL Eu.510
SEPARATE

FIELD CROPS

CEREALS

WHEAT

1 Robinson, D. H. **Growing spring wheat.** *J. Minist. Agric.* 1950, **56**, 501-4. [N.A.A.S. West Midland Province]

Practical recommendations for spring wheat growing, and the results of field trials to determine the influence of nitrogen applications on the yield of Atle and Bersée wheats under west Midland conditions, are given.—P.J.B.

2 Troup, L. G. **The cultivation of spring wheat.** *Farming* 1950, **4**, 42-3 and 60. [Lord Wandsworth College, Hampshire]

Trials show that satisfactory results can be obtained from using the new Scandinavian spring wheat varieties, in particular Atle, either as cover crops or as alternatives to barley. Their adaptability enables them to be sown at almost any point in the rotation.—E.B.H.

3 Horne, F. R. **Varieties of cereals for spring sowing.** *J. Minist. Agric.* 1950, **56**, 504-7. [Nat. Inst. Agric. Bot., Cambridge]

Notes are given on the following: spring wheats for mid-February to end of March sowings; Atle, Bersée and Meteor: spring wheats for April sowings; Fylgia, Atle and April Bearded: spring barleys of high malting quality; Plumage-Archer, Spratt-Archer, Earl and Golden Archer: spring barley of lower malting quality; Kenia, Maja, Freja and Camton: spring oats for highly fertile soils; Eagle, Sun II, Milford and Aberystwyth S. 84: spring oats for medium fertile soils; Onward, Star, Marvellous, Early Miller, Craigs Afterlea and Supreme: spring oats for low and very low fertility soils; Victory, Maldwyn, Golden Rain and Black Tartarian.—P.J.B.

4 Thomas, I., and Watson, E. R. **New cereal varieties in Australia—1948-49.** *J. Dep. Agric. W. Aust.* 1950, **27**, 269-72, bibl. 7.

See also *Fld Crop Abstr.* 3, Abs. 116.

A brief account is given of the progress made and of the methods used for breeding cereal varieties in Australia. Short descriptive notes on the following wheat varieties, for registration in 1948-49, are given (the first part of the name refers to the recurrent parent and the numeral to the year of registration): Bencubbin 48, Dundee 48, Javelin 48, Rapier 48, Ridley 48, Scimitar 48, Seewari 48, Curlew and Brolga.—K.O.

5 Argentine Republic, Ministerio de Agricultura y Ganaderia. Misc. Publ. No. 326. Variedades de trigo aconsejadas por el Tribunal de Fiscalización de Semillas para la siembra del año 1950. [**Wheat varieties recommended by the Seed Certification Tribunal for sowing in 1950.**] 1950, pp. 13, 1 map.

The wheat growing region of Argentina is mapped and divided into 6 sub-regions, for each of which tested varieties are recommended. Notes on sowing dates are given.—E.B.

6 Olsen, H. A. Crianza de nuevas variedades de trigo en la Estacion Experimental de Bordenave. [**Breeding of new wheat varieties at Bordenave Experimental Station (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 164-6. [Est. Exp. Bordenave, Argentina]

7 Leiboff, R. O. Rendimiento de 12 variedades de trigo y sus epocas optimas de siembra en Guatraché. [**Yields of 12 wheat varieties and their optimum sowing dates in Guatraché (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 192-6. [Est. Exp. Guatraché, Argentina]

In trials over eight years, Benvenuto Inca was shown to be the oustanding variety. Optimum dates for sowing in the area of Guatraché were established for each of the twelve varieties tested. —N.G.S.

8 Leiboff, R. O., and Rath, J. Dos nuevas variedades de trigo obtenidas en la Estacion Experimental de Guatraché: Sureño M.A. and Cheg 161 × 8842. [**Two new wheat varieties bred at Guatraché Exp. Sta. (Argentina): Sureño M.A. and Cheg 161 × 8842.**] *Memoria de la cuarta reunion de trigo, avena, cebada, y centeno* 1950, 59-63. [Est. Exp. Guatraché, Argentina]

The variety Sureño M.A. was obtained from the cross Cheg 152 × (14) 443. When sown in the second fortnight of June, its time from germination to flowering is 131 days, and from germination to (yellow) maturity 173 days. It is semi-resistant to *P. triticina*, and shows resistance to *P. glumarum* and *P. graminis*. It is drought- and frost-resistant. Its average yield in the 5 harvests for 1943-1948 was 1557 kg. per ha. The variety Cheg 161 × 8842 is resistant to the major diseases, and also to frost and drought. When sown in the first fortnight of

June, its time from germination to flowering is 137 days, and from germination to (yellow) maturity 173 days. Its average yield for the 5 harvests 1943-1948 was 1341 kg. per ha.—N.G.S.

9 ROTOURS, V. F. des. Comportamiento de variedades de trigo en la Estacion Experimental de Manfredi. [**Behaviour of wheat varieties in Manfredi Experimental Station (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 179-85. [Est. Exp. Manfredi, Argentina]

The highest yielding varieties for each sowing date were as follows: 1st May, Buck Quequén; 20th May, Klein Cometa; 10th June, Klein Cometa; 30th June, Benvenuto Inca, 20th July, Benvenuto Inca.—N.G.S.

10 GARBINI, S. E. Comportamiento de variedades de trigo en Pergamino. [**Behaviour of wheat varieties in Pergamino (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 186-91. [Est. Exp. Pergamino, Argentina]

The varieties giving the highest yields for the different sowing dates were as follows: May 1st, Buck Quequén; May 20th, Klein Cóndor; June 10th and July 1st, Benvenuto Inca; July 20th, Sinvalocho M.A. The highest yields were obtained from the wheat sown on June 10th.—N.G.S.

11 BALLARI, C. P. Ensayo de orientacion con 8 variedades de *T. durum* en la Sub-Estacion Experimental de Pico. [**Comparative trials of 8 varieties of *Triticum durum* in the Experimental Sub-station of Pico (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 197-8. [Sub. Est. Exp. Pico, Argentina]

The hard wheat Candeal Sel. La Previsión yielded best with 660 kg./per ha.—N.G.S.

12 ALBRECHT, A. R. Rendimiento de nueve variedades de trigo y sus epocas optimas de siembra en Rafaela. [**Yield of nine wheat varieties and their optimum sowing dates in Rafaela (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 176-8. [Est. Exp. Rafaela, Argentina]

Dates of sowing were May 1st, May 20th, June 10th, June 30th and July 20th. The best sowing date was shown to be June 10th. For the first date, Buck Quequén yielded best, Klein Cometa for the second, and Benvenuto Inca for the others.—N.G.S.

13 CHABRILLÓN, A. L. Comportamiento de las variedades de trigo ensayadas por la red oficial en Tezanos Pinto, durante el trienio 1947-9. [**Behaviour of wheat varieties tried by the official network of Tezanos Pinto (Argentina), during the three years 1947-9.**] *Memoria de la cuarta reunion de trigo, avena cebada y centeno* 1950, 170-5. [Est. Exp. Tezanos Pinto, Argentina]

The most sown varieties in the province, Klein Cometa, Sinvalocho M.A., and Benvenuto Inca, gave the best and most regular performances. Of the new varieties, Massaux No. 5 and Olaeta 1078 (both spring wheats) were outstanding.—N.G.S.

14 RAMIREZ, A., and MONTAÑO, J. Posibilidades del cultivo del trigo en el Altiplano. [**Possibilities of wheat cultivation in the Altiplano (Bolivia).**] *Agros Cochabamba* 1948, **1**, 67-73. [Received 1950]. [Granja Exp. Tacagua, Challapata, Dept Ormo, Bolivia]

Out of twenty varieties tested, the following were shown to be the most suitable for the Altiplano. Marquis; Acero; Melanopus; Manitoba Hard No. 1; Mentana 243; Bletendre 1476; Ciro Menothi; and Klein Exito. Their average yield was 2504. 13 kg. per ha.—N.G.S.

15 SPAIN, Ministerio de Agricultura, Servicio de Capacitación y Propaganda, Pamph. No. 3-49 H. Trigos tremesinos o de ciclo corto. [**Three months', or short cycle, wheat varieties.**] By *F. S. de Sopranis.* Madrid, 1949, pp. 12.

These varieties are suitable to those Spanish regions which have an adequate rainfall in spring. Mentana, originating in Italy, is the best known of these varieties. Other varieties mentioned are: Quaderna, also from Italy; Nabawa, from Australia; and Ideal, selected by the Centre for Cereal Cultivation, Madrid.—E.B.

16 BURNETT, L. C., and others. **Varietal response to cultural methods with wheat.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 54-5.

Data are given of the date of ripening, lodging percentage, height, winter killing, test weight and, acre-yield of the winter wheat varieties Iohardi, M-78, Blackhawk, Ioturk, I-M-511, Pawnee, Minter, Kawvale, Iowin and Marmin, grown in standard community trials in Iowa during 1947 to 1949, inclusive. The varieties Iohardi, M-78 and Blackhawk headed the yield averages for 1947 and 1948 with 37.2, 36.6 and 36.6 bu. per acre, respectively.—P.J.B.

17 OREGON Agricultural Experiment Station. Sta. Bull. 476. **Field crop variety recommendations for Oregon.** 1950, pp. 24.

Brief notes are given of 15 wheat, 9 barley, 10 oat, 8 maize, 2 flax and 3 sunflower varieties and the cropping zones of Oregon for which they are recommended.—P.J.B.

18 **Ševčenko, F. P.** [**Resistance to disease of spring crops from seed of late-autumn sowings.**] [Russian] *Agrobiologija* 1949, No. 6, 152-5.

As a result of sowing spring wheat in late autumn the sanitary condition of the grain is improved. Such grain, when sown in the following spring, yields crops with increased disease resistance. High resistance to disease was recorded also in barley, oats and millet as a result of sowing in late autumn.—R.P.J.

19 McCoach, H. J. **Determination of mercury on wheat treated with an organic mercurial seed disinfectant.** *N.Z.J. Sci. Tech.* 1949, **31**, No. 3, 25-8, bibl. 2. [Dept Sci. Ind. Res., Wellington]

The method described was developed to determine the amount of mercury seed-dust present on wheat grain that had been treated with Ceresan.—M.H.

20 Patel, M. K., and others. **A modified treatment against loose smut of wheat.** *Curr. Sci.* 1950, **19**, 234-5, bibl. 2. [Plant Path. Lab., Agric. Coll., Poona]

Wheat seed was soaked in water at room temperature [figure not stated] from 8 a.m. to 12 noon. It was then spread in a thin layer on plain galvanised iron sheets in the sun for 1·5 — 2 hrs., and stirred once or twice to maintain contact with the hot surface. The temperature of the seed at the end of this treatment was 130-133°F. The seed was then thoroughly dried in shade, mixed with BHC to avoid insect attack and stored. It was sown in four replications at Pakhajan (Broach District), Jalgaon, Dharwar and Poona during 1948-9, and 1949-50. Results showed that this treatment completely controls loose smut (*Ustilago trictici*).—N.G.S.

21 Walker, J. P. **The control of take-all and eyespot.** *Hereford. agric. J.* 1950, **12**, 57-61.

Descriptions of both diseases, which are relatively new to Herefordshire, are given, together with control recommendations.—E.B.H.

22 Garrett, S. D. **The control of take-all under intensive cereal cultivation.** *J. Minist. Agric.* 1950, **56**, 514-6. [Bot. School., Univ. Cambridge]

A brief review of practical recommendations for controlling *Ophiobolus graminis*, with particular reference to the maintenance of soil fertility, the Chamberlain system (see *Agriculture*, Vol. 54, 425-6) and the ploughing-in of straw.—P.J.B.

23 Glynne, Mary D. **Close cereal cropping. Effect of cultural treatments of wheat on eyespot, lodging, take-all and weeds.** *J. Minist. Agric.* 1950, **56**, 510-4. [Rothamsted Exp. Sta., Harpenden, Herts.]

Trials are reported on the effect of various treatments on the control of eyespot (*Cercosporella herpotrichoides*), lodging, take-all (*Ophiobolus graminis*) and weeds in the 4th, 5th and 6th successive winter wheat crops following a crop heavily infected with eyespot. Sulphuric acid spray at a rate of 100 gal. of 12.5% B.O.V. by vol. per gal. had no effect on straw yields, except in one year when it increased straw yields by an average of 17.6 cwt. per acre over controls. Lodging was markedly decreased by spraying; in 1946 and 1948 control plot and sprayed plot lodging percentages were 90 and 31, and 58 and 3, respectively. Weeds were markedly reduced. The most effective time of spraying was in early spring, before the eyespot pathogen had penetrated the first two leaf sheaths. Ammonium sulphate applied soon after the spring spraying increased both straw yields and the prevalence of eyespot, both factors contributing to significant increases in lodging percentages. The nitrogen applications increased grain yields only when lodging was slight, or absent. In trials to determine the combined effect of seed rates and nitrogen application on the prevalence of take-all, the average percentage of given areas covered by take-all following seed rates of 1.5, 2.5 and 3.5 bu. per acre, with no nitrogen applied, was 20, 30 and 65% respectively. Where the same seed rates were employed and 4 cwt. of ammonium sulphate applied per acre, take-all percentages were reduced to 2, 5 and 9% respectively. Wheat yields of over 29 bu. per acre were maintained up to the sixth successive crop by optimum treatments of spraying, early nitrogen applications and thin sowing. The importance is stressed of early spring applications of nitrogen on light land where take-all is prevalent.—P.J.B.

24 Tonini, G. Degenerazione dei grani. [**Degeneration of wheat varieties.**] *G. Agric. Domen.* 1950, **60**, 230.

In the seed of the Mentana variety there are often red grains which differ in colour and shape from the normal grains. The number of such grains sometimes reaches 7 to 8 % or more. Their presence is explained by assuming that Mentana has crossed spontaneously with red grained wheat varieties. Pronounced falls in temperature before anthesis are believed to cause the partial sterility of the anthers and would favour these spontaneous crossings.—E.B.

25 Tallarico, G. La luce, il grano ed il pane. [**Light, wheat and bread.**] *Riv. Ecol.* 1950, **1**, 115-9, [English summary, p. 119].

It is explained how differences in the light factor determine the higher starch content in wheat grown in northern regions and the higher protein content of wheat of southern regions.—E.B.

26 Claver, F. K., and Sivori, E. Estudio termo-fotoperiodico de 3 variedades de trigo. [**Photoperiodic studies on three varieties of wheat.**] *Bol. Lab. Bot. La Plata* 1950, No. 1, 1.

27 Di Nola, F. Dare radici profonde al grano nel Mezzogiorno. [**Wheat in Southern Italy must have deep roots**] *Ital. agric.* 1950, **87**, 194-8.

A deep rooting system in wheat is essential in Southern Italy to reduce the danger of premature ripening caused by drought, high temperature and wind.—E.B.

28 Del Gaudio, S. Trattamenti presemina del grano con particolare riguardo a quelli idrici. [**Treatment of wheat before sowing with particular reference to water treatment.**] *Ann. Sper. agr.* 1950, **4**, 359-82, bibl. 20, [English summary, pp. 380-1]. [Sta. agr. sper., Bari, Italy]

A series of laboratory trials was carried out to study the influence of water, in particular, and of "rootone", on seed germination of *Triticum vulgare* var. Pusa 4. The growth of the resulting seedlings was studied with regard to water treatment only. By comparing the behaviour of treated and untreated seeds, the following conclusions were drawn: (a) with dry seeds and increasing temperatures the germination coefficient (expressed as a percentage) increases up to the optimum of about 20°C., and the average germination energy (number of days before germination) is more rapid up to 24°C.; (b) the germination coefficient of seeds treated with water is lower than in the controls, and this difference increases with the increase in temperature; (c) this depressing effect is more evident on fertile than on unfertile (sandy) soil; (d) if dry seeds are soaked in water at 15°C. for 24 hours, their weight and volume increase is 36 to 40% and 32 to 36% respectively; and their germination energy is more rapid (by 24 hours), but the germination coefficient is lower than in untreated seeds; (e) absorption of water by the seed is higher at 24°C. than at 15°C.; the absorption is also dependent on the duration of soaking and on the variety; (f) water treatment before sowing is harmful to the vitality of the seedling and to the further growth of the plant; (g) treatment before sowing with 1.5 to 2 parts per thousand of commercial "rootone" has a slight stimulating effect on germination.—E.B.

29 Mukherji, D. K. **Early stages of growth of wheat plants after vernalisation.** *Curr. Sci.* 1950, **19**, 345-6, bibl. 1.

The effect of vernalization upon the growth of *Triticum vulgare* var. Holdfast was studied. Seeds were bulk vernalized by exposing them to a temperature of 0°C. for 21 days after soaking for six hours at room temperature. Control seeds were similarly soaked but not vernalized. 100% germination was reached by the vernalized seed within 12 days from sowing, and by the controls in 16 days. Length of coleoptile and height of plant were greater in vernalized plants at every stage of growth, the difference being almost similar throughout. The patterns of growth were similar in both cases, but in the case of the vernalized seed, the growing points were elongated and pushed well up above ground level within a fortnight after sowing, while in the controls, the growing point remained at soil-level.—N.G.S.

30 Bolli, M. Ricerche sulle vitamine. Sulla funzione dell'acido ascorbico nei vegetali. [**Researches on vitamins. The function of ascorbic acid in plants.**] *Ann. Bot., Roma* 1949, **23**, 42-57, bibl. 9, [English summary, p. 57]. [Ist. bot., Univ. Perugia, Italy]

From trials carried out with the wheat variety Mentana and other plants, the following conclusions were drawn: (a) the germination of seeds treated with solutions of ascorbic acid (vitamin C) at one part per thousand, or at higher concentrations, is considerably delayed; lower concentrations delay or inhibit the development of secondary roots; (b) the respiration of plants treated with ascorbic acid solutions at 0.50 to 1 part per thousand is greatly increased, respiration in some cases being double that of the controls; (c) plants treated with vitamin C and then maintained in an atmosphere of nitrogen have, during the first hours, an intramolecular respiration (glycolysis) lower than that of non-treated plants; (d) vitamin C decreases the photo-synthetic process considerably as it causes an abnormal oxidation of the chlorophyll.—E.B.

31 Gattorta, G. Il fabbisogno di azotati in copertura al frumento rivelato da un nuovo reattivo in polvere. [**A new reagent in powder form which indicates the requirements of wheat for nitrates as a top dressing.**] *Ital. agric.* 1950, **87**, 407-10, bibl. 4.

The method proposed by R. H. Bray is explained. The application of this reagent has been studied with regard to winter manuring of wheat with N. —E.B.

OAT

32 Jones, E. T. **Varieties of oats for sowing in the spring.** *J. Minist. Agric.* 1950, **56**, 508-10. [Welsh Pl. Breed. Sta., Aberystwyth]

A brief account of the following oat varieties is given: Scotch Potato, Black Tartarian, Ceirch-du-bach and S. 220 for poor soils; Victory, Abundance, S. 84, Eagle, Golden Rain II, Star, Onward, Supreme, Maldwyn (S. 221) and Sun II for medium fertile soils; S.172 and Milford (S. 225) for highly fertile soils.—P.J.B.

33 PARODI, R. A. Comportamiento de cereales forrajeros en Manfredi y Cárcano. [**Behavior of forage cereals in Manfredi and Cárcano (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 250-7, [Est. Exp. Pergamino, Argentina]

In trials from 1942-9, the best oat for forage in Manfredi was Klein Mar and in Cárcano, Buck 20, and for grain, La Previsión 13 and Buck 20 respectively. In the last 2 years Bagé Sel. Klein gave very good yields both of forage and grain. Of barleys, Buck III and Trebi Sel. Klein gave the best grain and forage yields at both Stations. In ryes, Pico was outstanding, both for grain and forage. It also yielded more green matter than any oat or barley. It is concluded that rye provides the best winter forage, because of its greater resistance to low temperature and drought.—N.G.S.

34 LEIBOFF, R. O., and RATH, J. Trabajos de crianza en avena, cebada y centeno en la Estacion Experimental de Guatraché. [**Work in breeding oats, barley and rye in Guatraché Exp. Sta. (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 201-4. [Est. Exp. Guatraché, Pergamino]

Of oats, the selection 0 (18) 3 was the highest yielder with 632 kg. per ha. This, and other promising material, originated in a natural cross between *Avena byzantina* and *A. fatua*. In trials of barley for forage, the variety 177 × 642 with an average yield over 4 years of 1978 kg. per ha. gave the greatest yield of seed. Cheg 176 × 112 gave the highest yield of green matter in 1949 with 6001 kg. per ha. Of malting barley, the most promising material originated in the cross Hybrid 202 × (Stadler R. 40 × Orel); the best yielder was Cheg 202 × (13) 12. The Guartraché rye selection Sel. Local G. 2 proved superior to others tried.—N.G.S.

35 LEIBOFF, R. O., and RATH, J. Rendimiento en forraje y grano de variedades de avena, cebada y centeno a traves de 4 años de ensayo en Guatraché. [**Forage and grain yields of oat, barley and rye varieties in four years of trials at Guatraché (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 245-9. [Est. Exp. Guatraché, Argentina]

The varieties, La Previsión 13, Buck 2, and Buck 152 (*Avena byzantina*) proved similar to each other in performance, and were superior to Klein Mar (*A. sativa*). Of forage barleys, Primor × Trebi FCS and Buck II were superior to Massaux E.M. and Trebi Sel. Klein. The two malting barleys tried, La Previsión 19, and Malteria Heda showed no differences. Of ryes, Forrajero Massaux gave the highest yields of green matter, while Pico yielded most grain.—N.G.S.

36 GARBINI, S. E. Comportamiento de variedades de avena, cebada y centeno ensayadas en Pergamino. [**Behaviour of oat, barley and rye varieties tried at Pergamino (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 231-4. [Est. Exp. Pergamino, Argentina]

The following varieties yielded best. *Avena byzantina*; La Previsión 13. *Avena sativa*; Klein Mar. Forage barley; Buck III. Malting barley; La Previsión 19. Rye; Pico.—N.G.S.

37 BALLARI, C. P. Comportamiento de variedades de avena y cebada en Pico. [**Behaviour of oat and barley varieties in Pico (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 235-44. [Sub.-Est. Expt Pico, Argentina]

In comparative trials since 1939, the yellow oat (*Avena byzantina*) varieties La Previsión 13, Buck 20 and Buck 152 gave higher grain yields than the variety Klein Mar (*A. sativa*). There were no important differences between the yellow oats. For a forage barley, La Previsión 13 gave most green matter. Amongst forage barleys, Massaux E.M. gave the best yields of grain, while Trebi Sel. Klein yielded the most green matter. Of the two, Massaux E.M. grows faster and is less susceptible to frost. It is possible to graze it in the same month that it is sown.—N.G.S.

38 CHABRILLÓN, A. L. Comportamiento de variedades de avena, cebada y centeno, ensayadas por la red oficial en Tezanos Pinto, durante el trieño 1947-49. [**Behaviour of oat, barley and rye varieties tried by the official network in Tezanos Pinto (Argentina) during the three years 1947-9.**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno.* 1950, 226-9. [Est. Exp. Tezanos Pinto, Entre Rios, Argentina]

39 MURPHY, H. C., and others. **The development and increase of superior, disease-resistant varieties of oats.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 66-8.

Data are given of the origin, maturity, average height, grain colour, awn prevalence and stiffness of straw of the Bond derivatives Clinton, Benton, Sac, Cherokee, Bonham, Kent, Advance, Eaton, Mohawk, Nemaha and Shelby. All are susceptible to race 45 and similar races of crown rust (*Puccinia* *coronata*, var. *avenae*), the prevalence of which is increasing. The Iowa Station has made selections of backcrosses of (Clinton × Santa Fe) × Clinton which appear identical in performance and appearance to Clinton, but are resistant to *Helminthosporium victoriae* and all known races of crown rust. Other promising selections resistant to stem rust, both the smuts and the common races of crown rust have been made from Anthony-Bond × Boone and Mindo × Landhafer crosses.—P.J.B.

40 BURNETT, L. C., and others. **Varietal response to cultural methods with oats.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 50-4.

Data are given of the average dates of ripening, height, lodging percentages, test-weights and acre-yields of 18 oat varieties grown in trials at Ames and Kanawha in northern Iowa over the years 1945-48, inclusive. The average combined yields for the two locations were headed by Shelby (94.6 bu. per acre), followed by Clinton (91.2 bu.), Mohawk (89.9 bu.), and Colorado (87.1 bu.). The rust-susceptible varieties Ajax, Gopher, Erban, Vanguard and Iowa 105, ranked 9, 12, 13, 14 and 16 in the yields of the 18 varieties. Further data are given of the dates of ripening, height, lodging-percentages and acre-yields of 10 oat varieties grown in the standard community grain trials in northern, central and southern Iowa in 1948. In trials to determine varietal response in 10 oat varieties to ester, amine and sodium spray formulations of 2,4-D, the sprays were applied at recommended rates [not given] when the plants were 6 to 8 in. high. No significant differences were observed between the varieties in respect of date of ripening, height or lodging as compared with controls; but rather marked yield-differences between the varieties were noted. Data are given of the results of these trials. In sowing-date experiments, sowings of nine oat varieties were made at 10-day intervals from April 6 to May 27. The ripening dates of the varieties were only slightly influenced by sowing dates between the first 20 days of April. The ripening of sowings made between April 21 and May 20 was retarded about 2 days for each of the 10-day delays in sowing; sowings made during the last 10-day period were delayed an additional 7 days in ripening. Lodging data showed no correlation with sowing dates. Most lodging occurred in the first and last sowings and marked differences were noted between varieties. Grain test-weight was not influenced significantly by the first four 10-day sowing dates. The fifth and sixth sowing dates resulted in moderate and severe reductions in test-weight, respectively. Average acre-yields for the 6 different 10-day sowing dates were 95.1, 98.6, 82.7, 57.4, 51.7 and 27.6 bu. per acre.—P.J.B.

41 ISELY, D., and others. **Expediting the marketing of seed through improved testing procedures.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 191-2.

Studies were made on the use of 2,3,5-triphenyl tetrazolium chloride for the determination of oat and wheat seed viability. The methods used are not reported, but they are described as being able to give an accurate determination of seed viability in 4 to 6 hrs, and the commercial use of the procedures is said to be feasible.—P.J.B.

42 SHEALS, J. G. **Observations on blindness in oats.** *Ann. appl. Biol.* 1950, **37**, 397-406, bibl. 13. [N.A.A.S., Bangor, N. Wales]

The relative importance in North Wales of various factors said to cause blindness in oats was investigated. It is concluded that a direct attack on the developing panicles by frit fly (*Oscinella frit*) larvae and by adults and larvae of thrips was of little importance in causing the blindness encountered. Most of the blindness appeared to result from adverse physiological conditions probably operative during early growth. Varying varietal susceptibility to blindness was noted, and the effect on the subsequent panicles of an early insect attack on the vegetative parts of the plant is discussed.—Author's summary.

43 SARASOLA, J. A. *Helminthosporium victoriae* en Argentina y la receptividad de algunas avenas. [***H. victoriae* in Argentina and the receptivity of some oats.**] [Contained in] Argentina, Ministerio de Agricultura, Reunión de comunicaciones, V° aniversario del Instituto de Fitotecnia, 1949, p. 1. [Rotoprinted]

More than 200 lines and varieties of oats were infected with this fungus. All the varieties descendant from the Victoria strain were susceptible.—D.P.B.

BARLEY

44 STEAD, H. A. J. **Water requirements of winter cereals in the Karoo [S. Africa].** *Fmg S. Afr.* 1950, **25**, 16 and 22. [Grootfontein Coll. Agric., Middelburg]

Experiments at Grootfontein College of Agriculture on barley and wheat, showed that between 14 in. and 17 in. of irrigation water were required, depending on the crop. Time of application varied with the crop and its rate of growth. Barley required less water, and its growing period was shorter than that of wheat. Excessive irrigations caused the drainage of water into zones beyond the root area and this water was not available when the drying of the top soil layer occurred.—K.O.

45 Horne, F. R. **Cereal varieties in relation to soil fertility.** *The Times Survey of British Agriculture* October, 1950, 7. [Nat. Inst. Agric. Bot., Cambridge]

The difficulties of assessing the behaviour of new cereal varieties in relation to lodging are discussed. Trials in progress at the above Institute are concerned with hybrids of Spratt-Archer and Plumage-Archer with Scandinavian barley varieties which, it is hoped, will combine stiff straw and earliness with high yielding capacity. Hybrid 46, Nord Desprez, Jubilègem, Yeoman, and in low rainfall areas, Holdfast, are winter wheats suitable for combining. Recommended winter oat varieties are: Picton, Aberystwyth S. 172 and S. 147; and spring oats: Sun II and Eagle. Afterlea gives a good performance on fertile soils and Aberystwyth S. 225 (Milford) is a valuable nurse crop with grass and clover seed mixtures.—E.B.H.

46 Wageningen, Nationaal Comité voor Brouwgerst. Verslag van het brouwgerstrassenproefveld te Westmaas in 1947. [**Report on the malting barley variety trials at Westmaas in 1947.**] *Med. nat. Com. Brouwgerst* 1948, No. 15, 324-70, [French and English summaries, pp. 356-7].

A full account is given by W. Wilten, J. R. Wijbrans, Jr., and J. J. van Gastel of a trial of eight varieties of malting barley (Kenia, Balder, Lenta, Selecta, Hylkema 336/362, Carslberg, Weibull 4744, and Nova) combined with a trial of four different quantities of nitrogenous fertilizer (20, 40, 60 and 80 kg. per hectare). In addition to a summary in English, there are English headings to all tables and diagrams.—G.M.R.

47 Burnett, L. C., and others. **The development and increase of superior, disease resistant varieties of barley.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 68-70.

Data are given of the date of ripening, height, lodging percentage, test weight and acre-yield of the varieties Moore, Tregal, Montcalm, Mars, Wis.-38, Odessa, Kindred, Peatland, OAC-21 and Manchuria, grown in standard community grain trials in Iowa from 1946 to 1948, inclusive. In order of grain yield, the varieties were placed as listed above. In trials in 1948, Moore gave an average yield of 53.2 bu. per acre, followed by Tregal 52.4, Montcalm 50.0 and Mars 48.1 bu. per acre.—P.J.B.

48 Murphy, H. C., and others. **A study of parasitism, biologic specialization and pathogenicity of the organisms causing diseases of barley and sources of resistance.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 174-5.

On the basis of average root length and weight, as expressed as a percentage of that of an uninfected check, Clinton oats and the barley varieties Montcalm, Trebi, Kindred, Pillsbury and Mars were the most resistant among 1 oat, 1 spring wheat and 30 barley varieties tested for resistance to the isolate P-76 of *Pythium graminicola*. The barley varieties South Dakota B, Vantage, Odessa, and Arctic, and the spring wheat variety Newthatch, were the most susceptible of the varieties tested.—P.J.B.

49 Tessi, J. L. *Xanthomonas translucens* var. *cerealis* sobre cebada en la Argentina y determinacion de variedades resistentes a este parasito. [***X. translucens* var. *cerealis* on barley in Argentina and study of resistant varieties.**] [Contained in] Argentina, Ministerio de Agricultura, Reunion de comunicaciones, V°aniversario del Instituto de Fitotecnia, 1949, 5. [Rotoprinted]

The following barley varieties showed resistance: Carree de Printemps Escourgeans 1.F. 3158, Fong Tien, Kindred C.1. 6969, O.A.C. 21 and Wisconsin Winter × Glabron 2073.—D.P.B.

50 Nelson, R. T., and others. **Harvest results of inorganic fertilizer tests on sugar beets conducted in four states, 1947.** [n.d.] pp. 14.

MAIZE

51 Algeria, Gouvernement Général, Inspection Générale et Direction de l'Agriculture. Bull. No. 155. Le mïas et sa culture en Algérie. [**Maize cultivation in Algeria.**] By *P. Laumont* and *H. Laby*. [n.d.] pp. 48.

Information is given on the origin, development and present position of maize cultivation in Algeria. In 1948, the total area under grain maize was 6124 ha. and the average yield 10.3 q./ha. Old local kinds as well as imported varieties are grown. Selection, varietal and cultural trials, cultural requirements and methods, rotations, seed, etc. are dealt with. Information is also given on fodder maize, which is grown on a small scale. It is thought that the cultivation of maize, especially fodder maize, could be profitably developed mainly in the irrigated areas.—E.B.

52 Oregon Agricultural Experiment Station. Sta. Bull. 480. **Field corn production on the Umatilla Irrigation Project.** By *C. A. Larson*, *F. S. Viets*, and *R. W. Leamer*. 1950, pp. 16.

The need to increase maize production on the Umatilla irrigation project is emphasized and a summary account is given of the experiments carried out there with this object during 1946 and 1947. Fertilizer requirements, irrigation procedures, winter cover crops and 32 hybrids and varieties were tested and it is concluded that for good results nitrogen fertilizers should be applied in conjunction with long-season hybrids. For a preceding winter green manure crop, hairy vetch (*Vicia villosa*) is recommended.—C.L.S.

53 HULL, F. H., and SKINNER, T. C. **Corn fertilizer experiments.** *Florida Univ. Agric. Expt Sta.* Annual Reports for the fiscal years ending June 30, 1947, 1948 and 1949. p. 43 (1947) ; p. 40 (1948) ; p. 44 (1949).

Maize, following blue lupins ploughed under as a green manure crop, yielded 68 bu. per ac., compared with 30 bu. per ac. for maize grown without green manure. The green manured maize crop contained more protein than the unmanured crop. In spacing trials, there were no significant yield increases from maize spaced closer than 24 × 42 in. (approx. 6000 plants per ac.), regardless of heavy applications of fertilizer. Side dressing trials indicated that there was no significant response in maize yields to side dressings of more than 40-50 lb. N per acre, if 10-20 lb. N per acre were applied at planting time or a good stand of leguminous cover crop was ploughed in prior to planting.—P.J.B.

54 BERGAMO, Stazione Sperimentale di Maiscoltura. Publ. No. 57. Le introduzioni di piante e semi eseguite dalla Stazione Sperimentale di Maiscoltura nel 1949 (nn. 49001-49317). [**The plants and seeds introduced by the Experimental Station for Maize Cultivation in 1949 (Nos. 49001-49317).**] By *L. Fenaroli*. 1950, pp. 22.

Among the species introduced were *Zea mays* from USA, Spain, Mexico, Egypt, Australia, Austria, Portugal and Switzerland and *Sorghum vulgare* from USA.—E.B.

55 HULL, F. H., and CARVER, A. W. **Corn improvement.** *Florida Univ. Agric. Exp. Sta.* Annual Reports for the fiscal years ending June 30, 1947, 1948, and 1949. p. 47 (1947) ; p. 43 (1948) ; p. 48 (1949).

Trials in 1947 indicated that the hybrid Fla W-2 may be superior to Fla W1 on light soils or where the crop receives little or no fertilizer. It is a few days later in maturing than Fla W1, but is otherwise similar. In trials in northern Florida, Dixie 18, a new yellow hybrid, outyielded standard varieties by 40% and in the same tests, outyielded Fla W-1 by 20 %.—P.J.B.

56 BAIRD, P. D., and others. **Studies on a rapid test for the viability of corn for industrial uses.** *Cer. Chem.* 1950, **27**, 508-13, bibl. 10.

A brief description is given of the use of 2,3-5 triphenyltetrazolium chloride for the detection of dead maize kernels in grain samples. The test is simple and can be completed in four hours.—P.J.B.

57 FOSTER, G. H. **Methods of conditioning shelled corn.** *Agric. Engng, St. Joseph, Mich.* 1950, **31**, 497-502.

58 BLAIR, R. A. **Seed storage investigations.** *Florida Univ. Agric. Exp. Sta.* Annual Reports of the fiscal years ending June 30, 1947 and 1948, p. 195 (1947) and p. 204 (1948).

Shelled seed maize in storage was completely protected from weevils (*Sitophylus cryzus*) by mixing 2 grm. of 50 % DDT with each lb. of seed. The effect of different storage treatments on the emergence of maize 10 days after sowing was investigated. For air-dried seed, crib-stored for 4 months, emergence was 79.8 % ; for similarly stored seed given a seed dressing, emergence was 84.2 %. For seed air-dried for two months and refrigerated for 7 months, emergence was 71.4 ; for similarly stored seed given a seed dressing, emergence was 84.4 %. The emergence of new seed was 90.8 %. From these studies it was concluded that a reduction in food reserves in seed with a resultant lowering of emergence counts was the result of the association of air curing with high air humidities and temperatures during storage.—P.J.B.

59 ROSBACO, U. F. Conservación del maiz con chala. [**Conservation of corn in the husk.**] *Idia* 1950, **3**, 32.

In certain marginal areas in Argentina, maize conservation is made difficult by severe attacks of *Sitotroga cerealella* and *Calendra* spp. A trial is reported in which clean ears of the hybrids US13 and Colorado Santa Fe No. 3 were harvested with and without their husk, and stored for eight months. At the end of this period it was found that the ears in the husks had been affected 44 % less than those without husk. Those ears of Colorado Sante Fe No. 3. which were attacked in the husk were affected only at the tips. Far more of the US13 were affected. A loss of weight of over 10% occurred in the affected ears of both varieties.—N.G.S.

60 MELHUS, I. E., and others. **A comparative study of the disease-resistant qualities and growth response of native and exotic maize and related Andropogoneae.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 172-4.

Work on the selection of Guatemalan varieties of maize for resistance to *Helminthosporium turcicum* is reported. Commercial oat varieties, including Clinton, Cedar, Neosho, Rainbow, Boone, Control, Marian and Colo, were grown in Antigua, Guatemala, to study their resistance to *Puccinia coronata* var. *avenae*. All the above varieties were very susceptible ; in 1947, 7 of the 46 varieties tested were killed before heading and 11 had 60 % of their foliage killed. Three years' data from these studies indicated that oat varieties resistant to *P. coronata* var. *avenae* in Iowa are not resistant to the pathogen in Guatemala, a fact suggesting race differences in the pathogen and the need for precautions to prevent Guatemalan races entering the Corn Belt areas of the USA.—P.J.B.

61 HARRIS, H. M., and others. **Field and laboratory studies on the ecology and behaviour of the European corn borer in Iowa.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 243-5.

From aerial and ground spray trials on maize, it was concluded that applications of 1.5 lb. of DDT would effectively control *Pyrausta nubilalis* if applied at the peak of ovulation.—P.J.B.

62 TAYLOR, J. G., and DEAY, H. O. **Electric lamps and trays in corn borer control.** *Agric. Engng, St. Joseph. Mich.* 1950, **31**, 503-5 and 532, bibl. 5. [Purdue Univ. Agric. Expt Sta., Lafayette, Ind.]

In laboratory tests, the maximum attractiveness of gas discharge lamps to *Pyrausta nubilalis* was in the near ultraviolet range of between 3200 and 3800 A. In field studies on the effect of light intensity on attractiveness to *P. nubilalis*, lamps of relative intensities of 1, 2 and 7.5 gave catches of 12.2, 28.1 and 59.7 % of the total, respectively. In field tests, 7 electrocutor grids 36 in. square, consisting of three traps, each with one 100 watt mercury vapour lamp and 4 traps, each with five 30 watt 360 BL lamps mounted on the grid frame, were set 100 and 200 ft. apart on one side of a field of early-planted maize. Beyond 60 rows (200 ft.) from the lamps, the average *P. nubilalis* population was 269 borers per 100 stalks. The traps reduced this by 57 % at a distance of 46 rows (153 ft.) from the lamps and by 69.5 % at a distance of 26 rows (87 ft.) from the lamps. Trap design and grid spacing are discussed.—P.J.B.

63 KELSHEIMER, E. G., and others. **Biology and control of cutworms and armyworms in Florida.** *Florida Univ. Agric. Expt Sta.* Annual Reports for the Fiscal years ending June 30, 1947, 1948, and 1949. pp. 118 (1947) ; p. 66 and p. 212 (1948) ; p. 76 (1949).

Cutworms of many species usually destructive in seedbeds were readily controlled by the normal seedbed applications of DDT used for mole cricket control. Both DDT and chlordane were effective against southern armyworm (*Prodenia eridania*) ; BHC was not effective. DDT dusts and sprays were ineffective against fall armyworm (*Laphygma frugiperda*), a budworm on sweet corn. Methoxy DDT applied as a 3 % dust twice with a 3-week interval, in the leaf whorls of sweet corn plants effectively controlled *L. frugiperda*. In insecticide trials on maize in a number of equal sized plots [size and rates of insecticide application not indicated], 10 % toxaphene-treated plots yielded 22.5 lb. of maize, 1 % parathion-treated plots yielded 17.7 lb., followed by 11.1 lb. for isotox, 7.5 lb. for DDT and 0.4 lb. for the untreated control plots. Larval counts showed that 10 % toxaphene and 1 % parathion were outstanding for *L. frugiperda* control. In *L. frugiperda* control trials on grain sorghum, 10 % toxaphene, 0.5 % parathion and 5 % methoxychlor were the most effective of the insecticides used, followed in order by 5 % DDT, 1.5 % isotox gamma isomer, 5 % chlordane and 5 % ditolyl trichloroethane [rates of application not indicated]. The leaves of chlordane-treated plants showed severe phytotoxic symptoms as also, to a lesser degree, did the leaves of toxaphene-treated plants. Further trials on *L. frugipera* control in maize showed that poison-bait treatments were superior to spray or dust treatments. Parathion at a rate of 1 lb. per 800 lb. of wheat bran used as a bait, applied by throwing a small pinch into each leaf whorl, gave excellent control, as did baits incorporating DDT, 5 % chlordane and 5 % chlorinated camphene.—P.J.B.

64 KELSHEIMER, E. G., and WILSON, J. W. **Control of the lepidopterous larvae attacking green corn.** *Florida Univ. Agric. Expt Sta.* Annual Report for the fiscal years ending June 30, 1947, 1948 and 1949. p. 123 (1947) ; p. 121 (1948) ; p. 149 and p. 174 (1949).

No single application of dust or spray material for the control of fall armyworm (*Laphygma frugiperda*) and earworm (*Heliothis armigera*) on maize was found to be as effective as single applications of mineral oil + 0.2 % pyrethrins. In comparisons of four applications of 3 % DDT dust (one application when silks were well-formed and the remaining three at 3-day intervals thereafter) with one application of oil + 0.2 % pyrethrins, the percentage of marketable maize ears was 96.4 and 94.5 and the percentage of worm-free ears 85.9 and 83.3, respectively. The DDT gave rather better sideworm control than did the oil treatment and did not interfere with pollination. DDT applied as a 3 % dust or a spray of 2 lb. of 50 % DDT material in 100 gal. of water was generally ineffective in both autumn and spring tests for the control of *L. frugiperda* acting as a budworm, but two applications of methoxy DDT as a 3 % dust spaced 3 weeks apart gave good *L. frugiperda* control [no rates of application stated]. A number of insecticides were found to give good control of sideworm, *H. armigera* ; these included 5 % gytol (ditolyl trichloroethane), 3 % and 5 % DDT, and 5 % methoxychlor as dusts and 25 % DDT emulsion at 1 quart per 100 gal. of carrier as a spray [no rates of application stated]. In budworm control trials in which the predominant insect species was *H. armigera*, liquid formulations of DDT and parathion gave significantly better budworm control than dust formulations ; 1 quart of 25 % DDT emulsion [amount of carrier not indicated] was better than 1 lb. of 15 % wettable parathion to 100 gal. water. Liquid spray formulations of DDT, TDE, chlordane and toxaphene were compared with wheat bran baits incorporating these insecticides for budworm control (mainly *H. armigera*). The baits gave better budworm control than the sprays ; among the baits used, 5 % chlordane + wheat bran and among the sprays, 1 quart of 25 % DDT emulsion [amount of carrier not indicated] gave the best budworm control. In earworm [*H. armigera*] control trials, a single application of 2.5 % DDT in mineral oil applied with an atomizer just after the silks had wilted resulted in good control, with 5 % DDT dust a poor second.—P.J.B.

65 SHAW, R. H., and BARGER, G. L. **Experimental plot studies of climatic and microclimatic effects on Iowa crops.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 49-50.

Three methods, based on the definition of grain maturity as the time when the grain reaches its maximum dry weight, were used to determine the maturity of maize grain. The time interval from silking to maturity, as determined by an average of these three methods over a 2-year period was : early variety 50 days ; medium variety 50 days ; late variety 51.5 days. The time from date of silking to a stage at which the moisture content of the grain was 35 %, averaged 43, 50 and 59 days for early, medium and late varieties, respectively. From these data, it is concluded that the moisture content of grain, in itself, is not an accurate basis for the determination of the time when the grain reaches its maximum dry weight. Other experimental results with maize indicated that the interval from planting to emergence, the time rate of tasselling and silking and the time interval from tasselling to silking was approximately equal for early, medium and late maize varieties, but that a large part of the lateness of varieties was accounted for by varietal differences in the interval between emergence and tasselling ; the later the variety, the larger the interval between emergence and tasselling.—P.J.B.

66 MCNEW, G. L., and LOOMIS, W. E. **The physiological action of herbicides.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 181-2.

Water solutions of 0.5 lb. per acre of the sodium salt of 2,4-D, containing 0.5 % Dreft as a wetting agent, greatly reduced, or completely suppressed, tassel development in maize when applied between June 15 and July 1, just before visible tassel differentiation. The susceptible period appeared to be very short. 2,4-D sprays applied a few days later, or applied to stalks in a slightly more advanced stage of growth than the first mentioned, suppressed side-branch formation in the tassels. The first 2,4-D susceptible stage in maize was 4 to 5 weeks after emergence. At tassel emergence about two weeks later, a stage is reached at which ear development may be completely suppressed by overdoses of 2,4-D applied to the leaves with wetting agents. After pollination and fertilization, the maize plant is immune to normal applications of 2,4-D. It is considered that 2,4-D injury arises as a result of the derangement of meristematic differentiation rather than from the dislocation of normal cellular growth. Maize yields following applications at the 10-leaf stage of 0.5 lb. 2,4-D alone and 0.5 lb. 2,4-D together with 0.125, 0.25, 0.5, 1 and 2%-Dreft, were 94.5, 97.0, 76.7, 71.6, 53.8 and 32.5 bu. per acre respectively. These data indicated that 2,4-D injury to maize and subsequent yield reductions were directly proportional to the amount of wetting agent incorporated in the spray irrespective of the surface tension of the spray, which was 29 dynes in all cases where the wetting agent was used.—P.J.B.

67 CELESTRE, Maria Rosa, and SCARASCIA, G. T. Osservazioni su alcuni ibridi di prima generazione fra granoturchi. [**Observations on some first generation maize hybrids.**] *Ann. Sper. agr.* 1950, **4**, 953-67, bibl. 4, [English summary, pp. 966-7]. [Ist. Frutticolt. e Elettrogen., Roma]

Trials were begun in 1948 by crossing the maize varieties Saverio, Golden Bantam and Seminano. Seminano was obtained through a mutation induced by physical treatment of the ovaries of the variety Mokant. A part of the pollen employed had previously been treated with electro-magnetic fields and radiated energy. The offspring of these crosses were examined in 1949 with regard to flowering, pullulation, yield, percentage of sugar caryopses, etc. It was observed that the effect of treating the pollen was generally to induce earliness, to increase pullulation and, to a certain extent, yield. The abnormalities of Seminano apparently were not transmitted to its offspring.—E.B.

68 PORTJANKO, V. F. [**Vernalization of *Zea mays*.**] [Russian] *Priroda, Moskva* 1950, **39**, 63-6, bibl. 6.

Results of experiments indicate that the duration of vernalization of maize grain must be fixed in accordance with the ecological/climatic conditions of the region concerned, and the objectives in carrying out vernalization. In the conditions prevailing in the southern zone of the Ukranian SSR, vernalization for 15 to 20 days is best.—R.P.J.

69 KELLER, A. H. **A corn picker with stalk shredder.** *Agric. Engng, St. Joseph, Mich.* 1950, **31**, 512, and 534. [International Harvester Co., East Moline, Ill.]

A brief description of a new type of maize harvester in the developmental stage, among the advantages of which is a mechanical stalk shredder which kills up to 98 % of the *Pyrausta nubilalis* larvae present in the maize stalks.—P.J.B.

MILLET AND SORGHUM

70 LEIBOFF, R. O. Excelente para la región de Guatraché [Argentina] es el sorgo " Double Dwarf Yellow Sooner Milo." [**The sorghum Double Dwarf Yellow Sooner Milo is excellent for the Guatraché region.**] *Idia* 1950, **3**, 11-2.

At La Pampa Experimental Station, Guatraché, the sorghum variety Double Dwarf Yellow Sooner Milo proved outstanding in variety trials in 1948-9 and 1949-50. It is a hybrid between the varieties Early White Milo and Double Dwarf Yellow Milo. It grows to a height of 18-26 inches only, and has a vegetative cycle of 88-95 days.—N.G.S.

71 CICCARONE, A., and MALAGUTI, G. Prime prove di campo e di laboratorio per la lotta contro *Sphacelotheca sorghi* (Lk.) Clint. e per la conoscenza della sua biologia in Venezuela. [**Preliminary field and laboratory investigations into the control of *Sphacelotheca sorghi* (Lk.) Clint. and its biology in Venezuela.**] *Riv. Agric. subtrop. e trop.* 1950, **44**, 145-77, bibl. 54, [English summary, p. 175].

The disease caused by *Sphacelotheca sorghi* is reputed to cause an average loss of 30 % in sorghum crops in Venezuela. The trials were carried out at Maracay and Chirgua (at altitudes of 430 and 650 m. a.s.l. respectively) from November 1947 to April 1949. The experimental plots received occasional irrigations. The infections were generally heavier during the spring dry season than during or after a rainy period. No relationship was found between the severity of the infection and injuries to the grains, or manurial treatment. It is believed that the survival of the parasite is favoured by the local practice of leaving the stumps and roots of sorghum plants in the soil after harvest. The susceptibility to *S. sorghi* and other parasites of numerous sorghum varieties was tested. Some sorghum strains from abroad, particularly from the USA, showed an increasing susceptibility when grown locally. It was proved that *S. sorghi* can be controlled by treating sorghum seed with various fungicides. These were tested in different doses. The effect of the fungicides on seed germination and emergence was examined.—E.B.

72 EVELYN, S. H. **Sorghum breeding in the Sudan.** *World Crops* 1951, **3**, 65-8.

Evidence is given to suggest that Kordofan Province, in the Sudan, is the original home of the genus sorghum. It is concluded that all sorghums, including Johnson Grass (*Andropogon halepensis*), which is but a diploid form, belong to one species, and that the old name *Sorghum vulgare* should be adopted to cover all sorghums. Differentiation between them would then be on a purely varietal basis. In 1946, the Sudan sorghum collection amounted to 640 strains, of which 450 were local, and it is considered that there are still a further 200 strains to be found there. This collection was at the Gezira Research Station and promising material sent to other stations in the Sudan for further trials. In the Blue Nile Province, Dwarf White Milo proved so much better than the local strains of Feterita that an increased yield worth nearly £1.5 per acre could be obtained from it. Dwarf White Milo was shown to be resistant to the forms of common smut occurring in the Gezira, is less damaged by birds than Feterita, and matures a fortnight earlier. In Kassala Province the variety Aklamoi White was outstanding. Sorghum breeding was discontinued in 1946. Several factors affecting sorghum, such as resistance to attacks by *Striga hermonthica*, panicle emergence and leaf width, are briefly discussed.—N.G.S.

RICE

73 GOOR, G. A. W. van de. Bevloeiingsonderzoek bij sawah-rijst. [**Research in irrigating rice.**] *Landbouw, Bogor* 1950, **22**, 195-222, bibl. 43, [English summary, pp. 221-2]. [Gen. Agric. Res. Sta., Bogor, Indonesia]

In an experiment in growing flooded rice an average consumption of 2.63 litres water per hectare per second during 144 days' flooding was determined. Much water is necessary to produce the desired puddling of the soil, viz, 4.67 l. per ha. per second. After tillage, consumption fluctuates, but there is evidence that it increases until the crop is in full flower, after which it decreases. The water requirement calculated was 2000 litres per kg. dry matter. Other aspects of irrigation studied were (a) the effect of rice soil tillage upon the physical state of the surface layer, and (b) nitrogen nutrition and nitrogen supply in flooded soils. An English version of this article is to appear in *Cont. Gen. Agric. Res. Sta., Bogor, Indonesia*. In the experiment described diseases and pests reduced yield.—From author's summary.—G.M.R.

74 PIACCO, R. Razze di riso superfini. L'Arborio e il Bersani. [**Excellent rice varieties. Arborio and Bersani.**] *Ital. agric.* 1950, **87**, 357-60.

A description is given of the rice varieties Arborio and Bersani, whose cultivation has been spreading in Italy for the last few years. The grain of Arborio is the heaviest of all the Italian varieties, the weight of 1000 seeds being 47 grm.; sowing rate is about 2 q./ha.; and the milling return 55 %. The weight of 1000 seeds of Bersani is 41 grm. and the milling return 60 %.—E.B.

75 ADAIR, C. R. **Tests prove medium and short grain varieties best for Arkansas.** *Rice J.* 1950, **53**, No. 3, 8 and 13. [U.S. Dept Agric.]

Short-grain rice is not recommended for extensive production in Arkansas; but of them Cody, Caloro and Asahi are the most suitable. Of medium-grain varieties, Zenith, Arkrose and Kamrose are recommended. The long-grain varieties do not have as wide a range of adaptability as the medium-grain rices, but Rexark, Bluebonnet, Prelude, Arkansas Fortuna and Nira are recommended.—N.G.S.

76 WILLIAMS, A. H. **Rice varieties of California.** *Rice J.* 1950, **53**, No. 7, 6-10. [Div. Cereal Crops, Diseases, Bur. Plant Industr. U.S. Dept Agric.]

A rice variety for California requires to be hardy, to mature within 155 days, to yield well and to be of good quality. The varieties Caloro and Colusa have so far proved outstanding. In 1949, 80 % of the California rice crop was Caloro, 15 % Colusa, and 5 % of Conway, Onsen, Calrose and others. It is suggested that Calrose, a medium-grain rice similar to the short-grain Caloro, is likely to be more widely used. The author states that there is a need for a suitable long-grain variety for California.—N.G.S.

77 REVISTA DE AGRICULTURA, COSTA RICA. Variedades comerciales de arroz en California. [**Commercial varieties of rice in California.**] *Rev. Agric. Costa Rica* 1950, **22**, 275.

A short description of the following varieties of rice are given: Colusa; Conway; Caloro; Calrose; and Calady 40.—N.G.S.

78 RICE JOURNAL. **Louisiana rice varieties for 1950 and the future.** *Rice J.* 1950, **53**, No. 1, 13-6.

Recommended varieties are Zenith and Magnolia in the early short-grain class, Bluebonnet and Fortuna for midseason long-grain, and Rexoro and Texas Patna in the late long-grain type. The breeding programme is reviewed.—N.G.S.

79 RICE JOURNAL. **Century Patna proves its worth in Texas tests.** *Rice J.* 1950, **53**, No. 8, 24.

Century Patna is an early-maturing, long, slender-grain variety of rice. Preliminary reports are very encouraging.—N.G.S.

80 INGRAM, J. W. **Rice insects in Japan.** *Rice J.* 1950, **53**, No. 7, 30-2 and 41 [Sugarcane Exp. Sta., Houma, La.]

This article is abstracted from the author's findings in the Natural Resources Section Report 336 (23rd Aug., 1949) A of GHQ. Supreme Command for Allied Powers. It is estimated that insects cause a 10 % loss of food crops in Japan. Rice is the main crop, being grown on 53 % of the cultivated land. The rice stem borer (*Chilo supressalis.*) is the most serious pest. Chemical control was investigated. As rice straw is used for sericulture, the use of BHC resulted in injured cocoons. DDT was the most effective insecticide tried; three applications [rate not stated] gave over 50 % control. Light-trapping appeared to be of no value. The stem borer has a natural parasite in *Trichogramma japonicum* which is reported to destroy 70 % of first generation eggs, but less of the second generation. Varietal variations in resistance were noted, but this aspect requires investigation. The paddy borer *Schoenobius incertellus* is restricted to certain coastal areas, and overwinters in the stubble. Stubble burning, and efficient ploughing under would give 100 % control. There are four species of leaf hopper. Of these *Sogata furcifera* and *Nilaparvata lugens* are most prevalent in the spring and autumn respectively. Losses in rice fields from these hoppers may be 40 %. Their control is attempted by oiling the irrigation water and sweeping the plants with a bamboo or straw broom. DDT is reported to give poor control. Further investigation is needed. The leaf beetle (*Lema oryzae*) is attacked by nine parasites. Japanese farmers attempt its control by early-morning sweeping with a long box on a handle. Japanese entomologists recommend dusting twice with calcium arsenate, but the author draws attention to the damage caused by arsenic to rice in Louisiana. Control of the rice leaf-miner (*Chlorops oryzae*) is achieved by spraying three times [no rates given] with a derris emulsion. Further investigations into the control of insect pests in Japan are needed. The insect pests of rice in Japan have not yet appeared in the USA.—N.G.S.

81 PRUTHI, H. S. **The control of grasshopper pests of cereal crops.** *Indian Fmg* 1949, **10**, 416-22.

After describing the various grasshopper pests of rice, maize, millet, sugar cane, etc. in India, the author describes some old and new methods of control. Control by dusting with benzene hexachloride as Gammexane, Hexyclan, etc. is practical throughout the season. The rice grasshopper is killed by a dust containing 5 % BHC, whereas the fatal dose for the Phadka and Deccan grasshoppers is 7 % BHC. The poison may not take effect until from 10 to 18 hours after application. The quantity of dust applied per acre varies from 10 to 20 lb.

according to the density of the crop. The dusted crop is safe to use as cattle food 36 hours after treatment.—K.O.

82 RICE JOURNAL. **Stem rot—dangerous rice disease** [**in Louisiana**]. *Rice J.* 1950, **53**, No. 2, 7-8.

A description is given of *Sclerotium oryzae* and its control. Susceptibility varies with variety; the apparently more susceptible varieties all have thick stems, but no relationship between susceptibility and stem thickness has so far been established. Control measures include breeding for resistance, stubble-burning, and draining. Nitrogen fertilization increases susceptibility. Potash is believed to exert a controlling influence.—N.G.S.

83 WU, CHIH-CHIANG, and LI, LAI-YUNG. **Preliminary studies on the control of rice weevils, *Calandra oryzae*.** *Fukien agric. J.* 1950, **11**, 157-60, bibl. 4, [English summary, p. 160]. [Coll. Agric., Fukien Christian Univ.]

Preliminary experiments on the control of *Calandra oryzae* in rice were conducted in 1949 and 1950. 1 to 5 % of dry wood-ash, powdered lime, face powder [? talc] and powdered clay from river mud were mixed thoroughly and stored in cloth bags, each containing 16 oz. of dehusked rice. Twenty adult weevils of *Calandra oryzae* were added to the mixture in each bag. At the end of 3-month periods the number of living and dead weevils was counted and the loss in weight of rice due to insect consumption was noted. After 7 months of storage, loss in weight of rice treated with either 2.4 % of dry face powder or 4 % of clay, was reduced to half that of the untreated rice. Results are tabulated in Chinese.—From English summary.

84 PATTANAIK, S. **A simple sand culture equipment for growing rice plants.** *Curr. Sci.* 1950, **19**, 321-2, bibl. 1. [Ravenshaw Coll., Cuttack, India]

Two methods, termed the drip method and the flush method, of growing plants in sand substratum are described, with diagrams of the apparatus used. In the drip method, the nutrient solution is allowed to drip over the surface of the sand through glass pipes, a continuous flow being arranged. In the flush method, the nutrient solution is drained out each evening and replaced the following morning. The flush method results in healthier looking plants and the avoidance of crust formation on the sand. Again, the used solution is readily available for analysis.—N.G.S.

85 RICE JOURNAL. **New aerial method of applying fertilizer** [**and**] **2,4-D studied in Louisiana.** *Rice J.* 1950, **53**, No. 9, 12-3.

A mixture of NuGreen, a 44 % urea nitrate, and 2,4-D, in water were applied to a 5-acre plot of rice in one operation [rate not given]. It is stated that the spread was more even and uniform than when spread from the air in a dry form. [This statement is a consensus of four non-scientific opinions and not the result of scientific investigation.]—N.G.S.

86 ANTONIO, V. P., and RODRIGUEZ, J. **The effect upon the yield of rice variety Kaawa of the application of different amounts of ammonium sulphate.** *Philippine J. Agric.* 1950, **14**, 221-30, bibl. 1. [Tobacco Expt Sta., Ilagan, Isabela, P.I.]

Trials were carried out on the effect of four levels of ammonium sulphate application on the yield of Kaawa palagad rice. The results were as follows: the 150 kg. treatment resulted in a yield of 41.17 cavans per hectare [one cavan of paddy = 0.43545 quintals]: the 200 kg. treatment 38.66 cavans; the 100 kg. treatment 34.12 cavans and the 250 kg. treatment 30.45 cavans. The control plot yielded 28.03 cavans. The control plot plants headed 2 to 4 days earlier than the fertilized plots. The 250 kg. applications led to the profuse growth of vegetation at the expense of grain yield.—P.J.B.

87 DUGAST, R. Résultats d'essais comparatifs effectués à la Station Expérimentale Rizicole de l'Office du Niger. [**Results of comparative trials carried out at the Rice Experimental Station of the Office of the Niger**] *Bull. Agric. Congo belge* 1949, **40**, 2065-6.

Fertilizer trials with rice indicated that, at least in the year of application, phosphate has no effect on yield, but that ammonium sulphate increased yield. The increase was proportional to the dose applied, which was 200 to 500 kg./ha. Even at the highest dose, no lodging was observed. Dates of flowering and harvesting were not affected by sulphate of ammonia.—E.B.

88 CRUZ, S. R., and LAFORTEZA, A. **Artificial drying of rough rice.** *Agric. Engng J.* 1950, **1**, 20-3, bibl. 12.

89 SLUSHER, M. W., and MULLINS, T. **Production items and costs for enterprises on Arkansas rice farms.** *Rice J.* 1950, **53**, No. 1, 23-5, 28-30, No. 2, 20-2.

This article, in two parts, dealing with the economics of rice production is apparently to be continued later. A detailed study is made of the labour, power, methods, and materials used in rice production. A census of rice-growing farms in Arkansas is given; the total acreage under rice for 1948 is estimated to have been 2827 acres.—N.G.S.

90 MURRAY, D. B. **A uniformity trial with swamp rice.** *Trop. Agriculture, Trin.* 1950, **27**, 105-7. [Dept Agric., Trinidad, B.W.1.]
A uniformity trial with the local variety of swamp rice (Joya) was carried out at St. Augustine, Trinidad. It was shown that the standard error decreased with decreasing plot size. A table is given showing the plot size and minimum number of replications necessary to demonstrate significant differences from 4 % — 19 % between treatment means.—N.G.S.

RYE

91 PARODI, R. A. Selecciones de centeno de Manfredi. [**Rye selections of Manfredi** [**Argentina**).] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno.* 1950, 219-21. [Est. Exp. Manfredi, Córdoba, Argentina]
Sel. Manfredi 73 yielded best with an average of 243 kg. grain per ha., followed by Sel. Manfredi 76 with 207 kg. per ha.—N.G.S.

92 WILLIAMSON, J., and BALLARI, C. P. Comportamiento del Centeno Pico obtenido por la Sub-Estacion Experimental de Pico. [**Behaviour of Centeno Pico at Pico Sub-Experimental Station (Argentina).**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno.* 1950, 214-18. [Sub. Est. Exp. Pico, Argentina]
In trials since 1936 the rye variety Centeno Pico was shown to be superior to the other varieties tried. The average grain yield from 1936-1949 was 832 kg. per ha. and from 1943-9, 919 kg. per ha. Centeno Pico was formerly known as Comun Region Pico, the name being altered to make it clear that it is an improved variety.—N.G.S.

93 WALLER, E. 30 års jämförande sortförsök med höstråg vid Sveriges Utsädesförenings Västgötafilial. Skara. [**30 years' comparative varietal trials with autumn-sown rye at the Västgöta Branch Station of the Swedish Seed Association.**] *Sverig. Utsädesfören. Tidskr.* 1950, **60**, 371-9.
In the tests new forms resulting from breeding work at Savlöf were compared with current commercial varieties. Kung rye II is the most valuable variety for the region served by the Västgöta Branch Station, which includes the West Swedish counties of Skaraborg, Älvsborg, Göteborg and Bohus. The bred varieties now available show an increase in yield of approximately 15 % compared with unimproved rye.—R.P.J.

94 MAGNICKIĬ, K. P. [**Deficiency of magnesium in winter rye on podzolic sandy clayey soil.** [Russian] *Agrobiologija* 1950, No. 1, 96-9. [Sci. Res. Inst., Fert. Insect. Fungicides, Ljubercy]
Podzolic sandy clayey soils are deficient in available magnesium. With pronounced magnesium deficiency, rye makes weak development, after overwintering it almost dies, all phases of its development are greatly delayed, and an extremely low yield is obtained. The application of sulphate of magnesium or dolomite for neutralization of ammoniacal fertilizers caused a marked increase in yield, the magnesium having a greater effect on the yield of grain than on that of straw.—R.P.J.

GENERAL

95 WAGENINGEN, Netherlands. **Twenty-fourth descriptive list of varieties of field crops. 1949. Cereals.** 1949, pp. 50.

LEGUMES

COWPEA

96 BAIRD, E. W. **The commercial production of green manure seed in the Cairns hinterland.** *Qd agric. J.* 1950, **71**, 143-53.
The article describes the production, harvesting, diseases and seed pests of four varieties of cowpea (Groit, Giant, Cristaudo pea and Reeves Selection). These are grown in the Mareeba District of Queensland as green manure in the sugar cane rotation. The practice of growing velvet beans for seed in association with maize appears to be a sound one where machine-harvesting of maize is not adopted. It permits of two cash crops being produced simultaneously on the same land without detriment to either. Seed of the Gambia pea has been produced to a limited extent in rotation with the tobacco crop, but as it is difficult to establish on prepared ground it is only used as a volunteer crop on hard ground.—K.O.

SOYABEAN

97 HOLMBERG, S. A. Sojabönodlingens möjligheter och berättigande i vårt land. Några erfarenheter från förädlingsarbeten och försök vid Fiskeby. [**The possibilities of growing soyabean in Sweden. Results of breeding and experiments at Fiskeby.**] *K. Lantbr-Akad. Tidskr.* 1950, **89**, 460-8, [English summary].
As a result of hybridization and selection for adaptation to the Swedish climate, many strains of soyabean have been produced which ripen as far north as Norrköping, lat. 58°30'. At 2 stations in the districts of Ostergötland and South Kalmar three strains gave a mean yield of 27 bushels per acre during the 4 years 1946-49.—R.P.J.

98 WEBER, C. R., and WEISS, M. **Soybean variety and selection tests.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 60-1.

Adams, a selection from Dunfield × Illini crosses, has given slightly higher seed yields, has a higher seed oil content and is rather earlier than Lincoln. It was released to growers in southern Iowa in 1949. An experimental early strain developed in Iowa is adapted to the extreme north of Iowa and southern Minnesota. It has consistently surpassed the standard varieties grown in these areas, Earlyana, Early Minnesota Manchu, Habaro and Ottawa Mandarin, in seed yield and seed oil content.—P.J.B.

99 LANN, P. A. van der. Over de bestrijding van het katjangvleigje op kedelee met insecticiden. [**The chemical control of *Agromyza phaseoli* Coq. on soybeans.**] *Landbouw, Bogor* 1950, **22**, 97-122, bibl. 25, [English summary, pp. 21-2]. [Inst. Pl. Diseases and Pests, Gen. Agric. Res. Sta., Bogor, Indonesia]

An account is given of field experiments in which spraying or dusting with DDT or with HCH (hexachlorocyclohexane), applied immediately after the plants had come up and repeated every other day, effected a marked decrease in infestation by *Agromyza.* Results are shown in tables which give the insecticide and concentration used, the number of treatments, the percentage of plants killed by the pest and in some cases the yield of the various plots. Later experiments demonstrated that toxaphene, applied as spray or dust, gave still better results, but this control has not yet been tested in large-scale field experiments.—From author's summary.

100 NELSON, L. B., and ENGLEHORN, A. J. **Soybean production in relation to fertilizer applications and crop sequence.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 101.

Soyabean plants growing on high-lime Harpster soil in north-central Iowa were extremely chlorotic, but showed marked recovery 10 days after being sprayed with 1 % ferrous sulphate solution at a rate of 10 lb. of $FeSO_4.7H_2O$ per acre. On the same soil type, soyabeans sprayed with this rate of $FeSO_4$ yielded 30.8 bu. per acre, compared with 11.6 bu. per acre for unsprayed soyabeans. Mn, Zn, Co and Cu applications were ineffective in reducing chlorosis.—P.J.B.

GROUNDNUT

101 CARVER, W. A., and HULL, F. H. **Peanut improvement.** *Florida Univ. Agric. Exp. Sta.* Annual Report for the fiscal years ending June 30, 1947, 1948 and 1949. p. 41 (1947) ; p. 39 (1948) ; p. 42 (1949).

In peanut (*Arachis hypogea*) hybridization and pedigree selection trials, the variety Dixie Runner and three strains of the line Fla 230-118 gave a respective average of 49 and 32 % more sound seed than Florida Runner. In spacing trials with Dixie Runner, the spacing 6 × 36 in. produced 11 % and 21 % more seed per acre than 10 × 36 in. and 15 × 36 in. spacings, respectively. Yield comparisons showed that Dixie Runner was able to utilize space more efficiently than Florida Runner. In 1948 trials, the sound seed yield of Dixie Runner averaged 32 % more than that of Common Runner varieties. The highest yielding Spanish variety, Spanish 18-38, produced 19 % less sound seed than the Common Runner varieties. Fla 249-40, Fla 231-51 and Ga 207-3 have shown most promise as hybrid combinations and the best selections for large pod size have resulted from crossing *Arachis rasteiro* with large-podded strains related to Virginia Jumbo.—P.J.B.

102 SCHWARZ, M. B., and HARTLEY, C. De selectie van Schwarz 21, een tegen slijmziekte resistente lijn van *Arachis hypogaea.* **The selection of Schwarz 21, a strain of *Arachis hypogaea* resistant to *Bacterium solanacearum.*** *Landbouw, Bogor* 1950, **22**, 223-44, bibl. 15, [English summary, pp. 243-4]. [Inst. Pl. Diseases and Pests, Bogor, Indonesia]

An English version of this paper is to be published as *Cont. Gen. Agric. Res. Sta., Bogor, Indonesia.*—G.M.R.

103 GAZETA DO AGRICULTOR. **Control of *Cercospora personata* and *C. arachidicola.*** *Gaz. agric., Mozambique* 1950, **2**, 113.

Disease of groundnuts caused by these fungi can, it is claimed, be controlled with sulphur. The plants should be dusted [quantity not stated] three or four times at intervals of two weeks after the first spots appear on the lower leaves at about sixty days after sowing. The treatment improves the quality besides the quantity of the crop.—E.B.

104 FORTINI, S., and VENEZIAN, Maria Elisa. Studio su alcuni sistemi enzimatici del l'*Arachis hypogaea.* [**Study on some enzymatic systems of *Arachis hypogaea.***] *Ann. Sper. agr.* 1950, **4**, 751-66, bibl. 7, [English summary, p. 766]. [Sta. chim.-agr. sper., Roma]

The recent theories on the mechanism of the catalase activity are briefly reviewed and a mathematical interpretation of the oxydase activity is given. The oxydase and catalase activities were determined from the end of June to the beginning of November on leaves and seeds of *Arachis hypogaea* grown in the field. Contrary to other plants examined, in this species the catalase and oxydase processes proceed at the same time. Tables and graphs illustrate the findings of this investigation. It was observed that up to 25th August, when seed setting started, the oxydase activity increased and the catalase activity decreased. The two activities are correlated with respiratory and photosynthetic processes. The rate of the catalase activity determined in the morning was different from that found in the afternoon.—E.B.

105 BLEDSOE, R. W., and HARRIS, H. C. **Nutrition and physiology of the peanut.** *Florida Univ. Agric. Expt Sta.* Annual Reports for the fiscal years ending June 30, 1947, 1948 and 1949. pp. 50 (1947) ; p. 48 (1948) ; p. 51 (1949).

In peanut (*Arachis hypogea*) experiments, 250 lb. of sulphur per acre were applied to the plants in frequent dustings, 250 lb. per acre were applied to the soil in one dusting and 90 lb. per acre were applied to the soil in four dustings. Foliage colour was most markedly affected by the frequent dusting treatment. Frequent dustings greatly reduced leaf-spot incidence, but the single soil treatment and the four dustings gave only moderate decreases in leaf-spot incidence. The frequent dustings increased total nut yields by 14 %, the soil application decreased yields by 12 % while the four dustings had no effect on yields, as compared with untreated controls. In experiments on Dixie Runner peanuts, the plants were grown with the roots and fruiting zones in separate containers and media. Radioactive calcium was found to move up from the roots into the plants readily, but only a trace of the calcium subsequently found its way into the fruiting bodies. On the other hand, calcium applied to the fruiting zone was readily absorbed into the fruiting bodies and a proportion of the calcium moved back into other parts of the plants. These facts are considered to explain why it has been found that a good supply of calcium is necessary in the pegging zone of the plants, to promote good nut development. On Arredona loamy fine sand, applications of 10 lb. per acre of copper chloride increased the proportion of sound to shrivelled nuts, as compared to untreated plots. This treatment had no effect on the oil and nitrogen content of the nuts. Copper sulphate applied in 1942 had a pronounced beneficial residual effect on Dixie Runner peanuts in 1945. See also *Fld Crop Abstr.* 2, Abs. 1324.—P.J.B.

106 KILLINGER, G. B., and STOKES, W. E. **Effect of environment on the composition of forage plants.** *Florida Univ. Agric. Expt Sta.* Annual Report for the Fiscal year ending June 30, 1947, p. 47.

The oil content of peanuts (*Arachis hypogea*) increased 2 to 3 % following 3 to 6 applications of dusting sulphur at a rate of 20 lb. per acre, starting at the time of appearance of the first blooms. The highest oil increases were noted in peanuts on sandy soils and the lowest increases in peanuts grown on clay soils.—P.J.B.

107 BEATTIE, J. H. **A simple, low cost sheller for peanuts, beans, and peas.** *Agron. J.* 1950, **42**, 56-7. [Bureau of plant Industr. Soils and Agric. Engng, Beltsville, Md]

Illustrated details are given of a sheller designed to provide a quick and economic method of shelling small to medium-sized lots of peanuts, dry beans and peas from experimental plots.—P.J.B.

PEA

108 WAGENINGEN, Netherlands. **Twenty-fourth descriptive list of varieties of field crops, 1949. Pulses** (**peas, common beans, haricot beans**). 1949, pp. 29.

109 WALLEN, V. R., and SKOLKO, A. J. **Antibiotic XG as a seed treatment for the control of leaf and pod spot caused by *Ascochyta pisi*.** *Canad. J. Res.* Sect. C. 1950, **28**, 623-35, bibl. 18. [Bot. and Plant Path. Div., Sci. Service, Dept Agric., Ottawa]

The soaking of diseased pea samples in Antibiotic XG at a concentration of 25 ppm for 18 hr. effectively controlled *A. pisi* and did not seriously impair seed germination. The treatment is compatible with Spergon applied after the seed has been air dried. Antibiotic XG is stable for 18 months in acetone and for at least 2 months in alcohol and is not highly toxic to seed up to concentrations of 25 ppm. Its fungistatic action is not seriously affected by the pH of the solution. The treatment is less injurious than hot-water treatment and is very suitable for obtaining small quantities of disease-free seed.—P.J.B.

110 GOVANDE, G. K. **New strains of pulses and millets in Baroda State.** *Indian Fmg* 1950, **11**, 153-4.

The Pulses and Lesser Millets Improvement Scheme [for Baroda] concluded in the year 1948-9, with the following results. *Cajanus indicus* : no conclusive results were obtained. Selections Dehgam 35 and Vijapur 49 were promising. *Phaseolus aconitifolius* : Bleswar 12 and Medhi 33 were the best strains, with protein contents of 23.98 % and 23.28 % respectively, both higher than that of the local crop. *Cyamopsis psoraloides* : Malosan 40, while having a protein content 0.78 % less than the local crop, gave, on average, 75 lb. more seed per acre. *Paspalum scrobiculatum* : selections Baroda 8 and Baroda 15 were much superior to the local crop, selection Vyara 31 was also promising. *Eleusine coracana*: Jagudan 44 yielded 17 % more grain than the local crop.—N.G.S.

BEAN

111 Canada, Department of Agriculture. Publ. 843. Fmrs' Bull. 164. **Field beans in Canada.** By *W. G. McGregor*, *A. J. Machean*, and *V. R. Wallen*. 1950, pp. 14, figs 4.

A descriptive account is given of the bush or dwarf varieties of the genus *Phaseolus*. The following aspects are dealt with: production, varieties, marketing, cultural practices and diseases.—C.L.S.

112 Rolfo, F., and Odiozabal, O. Ensayos con distintas variedades de Vicias. [**Trials with different varieties of *Vicia* (in Uruguay).**] *Rev. Asoc. Ing. Agrón.* 1950, **21**, 12-9. [Escuela Práctica Paysandú Uruguay]

The following species and varieties of beans proved outstanding. *Vicia villosa*, *V. disperma*, *V. atropurpúrea*, *V. sativa* var. *hyemalis*, *V. sativa* var. *gaudin*, and *V. sativa* var. *primavera*. The beans were sown between March and August. Autumn sowings proved best for forage production, and winter sowings for seed production. For forage, the seed rate (broadcast) was 70-90 kg. per ha. For mixed sowings the rate was 50 kg. beans and 70 and 80 kg. cereals per ha. When sown for seed, row widths of 0.5-0.6 m., with the plants 0.15 and 0.20 m. apart in the row, were tried, with no appreciable resultant difference. Monthly figures for temperature and rainfall are given and compared with standards. Dates of sowing, germination, flowering, and harvesting, together with the yields obtained, are set out in tabular form for the years 1943 and 1944, both for beans for forage and beans for seed. For forage, *V. sativa* var. *primavera* and *V. atropurpúrea* gave the best yields, while *V. sativa* vars. *primavera* and *gaudin* gave the highest yields of bean seed. The effect of growing *V. atropurpúrea* with wheat, barley, oats and rye was investigated. The highest yields, 23.2 kg. per ha., were obtained from the mixture with the barley variety 702^a. Hay yields, in percentages of green matter, for the various bean varieties are given. The best hay, both in quantity and quality, was from *V. disperma*. Varietal differences in resistance to drought and frost are noted. The largest yields were obtained on soils with a high pH and rich in calcium. It is concluded that beans are well adapted to Uruguay.—N.G.S.

113 Tsi, Chao-Seng. **Protection against aphids by seed treatment.** *Nature, Lond.* 1950, **166**, 909-10. [Dept Entomol., Coll. Agric., National Peking Univ., Peking]

By soaking seeds of various plants (e.g., bean, cotton, pea) in an aqueous solution of *bis* (*bis*dimethylamino phosphonous) anhydride, the establishment of aphids and red spider on the plants grown from the seed is prevented for a considerable time. It is suggested that the treatment may be suitable for the control of other insects, provided the seed treated is large enough to allow for the absorption of a sufficient amount of the active principle. Full details of this work are to appear elsewhere.—M.H.

114 Johnson, C. G. **Infestation of a bean field by *Aphis fabae* Scop. in relation to wind direction.** *Ann. appl. Biol.* 1950, **37**, 441-50, figs 2, bibl. 1. [Rothamsted Exp. Sta., Harpenden, Herts.]

115 Katznelson, H. **The detection of internally-borne bacterial pathogens of beans by a rapid phage-plaque count technique.** *Science* 1950, **112**, 645-7, bibl. 6.

116 Agricultural Gazette of New South Wales. **The bean weevil (*Bruchus obtectus*).** *Agric. Gaz. N.S.W.* 1950, **61**, 585-6.

The main damage caused by this beetle occurs in the stored bean seed. Infestation may be prevented by mixing through the seed (a) 2 % DDT dust at the rate of 2 oz./bu., or (b) copper carbonate or copper oxychloride at the rate of 1 lb./bu. Infested seed may be fumigated with carbon bisulphide in an airtight container, using 1 fluid oz. to 16 cu. ft. The gas should be allowed to act for 24 hr., after which the seed should be spread out on an insect-free surface to dispel the fumes.—K.O.

117 Wylie, W. D., and others. **Insect pests and their control.** *Florida Univ. Agric. Expt Sta.* Annual Reports for the fiscal years ending June 30, 1947, 1948 and 1949. p. 181 (1947); p. 190 (1948); p. 184 (1949).

In leaf hopper control trials on beans, DDT, both as an emulsion and as wettable DDT at 1 lb. actual DDT per 100 gal. carrier, and BHC, gave excellent initial kills. Chlordane (25 % emulsion at 1 quart per 100 gal. of carrier) was ineffective and Indalone severely damaged the plants. In flower-thrip control on beans, dust formulations of 5 % chlordane and 5 % DDT were very effective; BHC (1 % gamma isomer) 5 % rhothane and 5 % toxaphene were almost as effective, whilst 5 % methoxy DDT gave poor results [rates of application not stated]. In maize earworm (*Heliothis armigera*) and maize silk-fly (*Euxestia stigmatias*) control trials, 5 % rhothane, followed by 5 % toxaphene applied as dusts 5 times at 4-day intervals were most effective against *H. armigera*, though single oil + pyrethrum injections gave better control than the dusts. For *E. stigmatias*, no dust treatments used were entirely successful, though Chlordane [no details given] gave the best results. In further experiments to control *H. armigera*, plots sprayed with 2.7 % oil-based DDT yielded 100 % worm-free ears, though kernel formation on many ear tips was inhibited ; 5 % DDT was the best dust treatment giving (39 % worm-free ears), followed by 5 % DDT dust and 1 % parathion dust. Chlordane methoxychlor and chlorinated camphene gave poor results [no rates of application stated]. All treatments were given 6 times in all, at 3-day intervals during the silking period. Single treatments with oil-based DDT spray when the silks were starting to wilt was as effective as 3 treatments at 5-day intervals beginning at the time the silks first appeared. In trials to evolve a treatment giving simultaneous control of *H. armigera*, *E. stigmatias* and fall armyworm (*Laphygma frugiperda*), 2 % parathion dust was superior to all other dusts tested. Chlordane dust and spray gave excellent *E. stigmatias* control in limited tests. Atomized 2 to 3 % oil-based DDT on wilted corn silks at a rate of 0.6 to 1.2 c.c. per ear gave excellent *H. armigera* control from a single application, when properly timed. Early planting was shown to be a factor in reducing *H. armigera* and *E. stigmatias* damage.—P.J.B.

118 MITCHELL, J. W., and LINDER, P. J. **Absorption and translocation of radioactive 2,4-DI by bean plants as affected by cosolvents and surface agents.** *Science* 1950, **112**, 54-5.

119 VENEZIAN, Maria Elisa. L'attività ossidasica in relazione con la simbiosi batterica delle leguminose. Nota 1. [**The oxydase activity in relation to bacterial symbiosis in leguminous plants. Note 1.**] *Ann. Sper. agr.* 1950, **4**, 735-49, bibl. 14, [English summary, pp. 748-8]. [Sta. chim.-agri. sper., Roma]

In this research carried out with *Vicia faba*, the oxydase activity was determined on the leaves, the root, the nodules and the fruit (in the beginning on the whole pod, then on the seed only). At the same time the microscopic material was prepared. The experimental period lasted from 4th April (approximate date of appearance of the nodules) to 6th June (date of complete ripening of the seeds). The intensity of the oxydase activity was correlated throughout the experimental period with the symbiotic process in particular with the various characteristic forms of *Bacterium radicicola* found in the root nodules. The period of the highest oxydase activity corresponded to that of the setting of the pods. The oxydase activity in the ripe seed was nil.—E.B.

ROOTS

SUGAR BEET

120 ROSSI, U. La bietola da zucchero in provincia di Modena. [**Sugar beet in the province of Modena.**] *Ital. agric.* 1950, **87**, 146-54.

Land reclamation and irrigation have resulted in sugar beet being grown over an area of about 2500 ha. Yields per hectare in 1948 and 1949 were 250.77 and 194.62 q. of roots and 39.15 and 34.23 q. of sugar, respectively. The decline in yield per hectare is imputed to climate correlated with the nature of the soil. Low yield is, however, often partly compensated for by a high sugar content, which may exceed 18 %. Sugar beet is grown as a cleaning crop in the rotation, before wheat. General information on the region and on cultural methods is given. The advantages of this crop are described. —E.B.

121 HARRIS, L. and others. **Planting and irrigation studies with sugar beet.** *Nebraska Univ. Agric. Exp. Sta.* 62nd Annual Report, 1949, pp. 124-5.

The yield of sugar beet sown on April 3rd., and irrigated one to two days after sowing was 24.1 tons per acre, compared with 19.3 tons per acre for sugar beet sown on the same date but not similarly irrigated. For sugar beet sown on April 18th and May 2nd., the yields for irrigated and non-irrigated sowings were 22.1 and 21.3, 19.6 and 19.3 tons per acre, respectively. In the above trials there were no significant yield differences between normal surface sowing of the seed and surface sowing followed by ridging to cover the seed to a depth of 4 to 5 in.—P.J.B.

122 FLAMINI, B. Ulteriori indagini sul seme monogerme di bietole. [**Further investigations on single-germ seed of sugar beet.**] *Industr. saccar. ital.* 1950, **43**, 193-8, bibl. 12.

Although results of previous trials showed that on the whole there was no advantage in employing single-germ seed in Italy (see *Fld Crop Abstr.* 3, Abs. 881), the Institute of Agronomy of the University of Bologna carried out a further investigation to determine whether there is any benefit in sowing single-germ seed in certain circumstances, such as when labour for thinning is short or when thinning is delayed through excessive rain. The repeated manuring given to the trial plots had reduced their tendency to form a hard crust which is more harmful to seedlings from single-germ seed than to those from normal seed. In the trial both types of seed were tested and thinning carried out at three different periods, early, normal and late, using seven replications. A regular plant cover formed in all cases. Results showed that : (a) the lowest root and sugar production per ha. with both types of seed was obtained when thinning was carried out late; (b) the average root yield of sugar beet from single-germ seed was higher than that obtained from seed clusters; (c) the lower root production from normal seed was counterbalanced by their higher sugar content (average sugar production per ha. was about 78 q. with both types of seed). —E.B.

123 COONS, G. H. **Space relationships as affecting yield and quality of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 252-68, bibl. 40.

The author reviews a wide range of experiments on the spacing of sugar beet, from early trials with little replication to trials involving complex statistical methods. He points out that, although the importance of high populations of uniformly distributed plants is now well known, further research is needed to make the best use of sugar beet in mechanized farming; particular lines of attack suggested include alterations in cultural and manurial practices to favour early growth and ripening, the production of varieties with spherical roots, and the interaction of variety, agricultural practice and environment.—G.K.G.C.

124 FRAKES, M. G. **Effect of spacing and doubles on yield of sugar beets in the Michigan area.** *Proc. Amer. Soc. Sug. Beet Technol* 1948, 269-70. [Michigan Sugar Company, Saginaw]

In replicated trials conducted in 1946 and 1947 yield of roots and of sugar were not significantly affected by leaving up to 30 per cent of doubles (2 plants in a 3 in. block or less). In rows 28 in. apart, plots thinned to 6 in. with no doubles gave significantly lower yields than plots thinned to 8, 10, 12 or 16 in. in 1946; in 1947 plots thinned to 10, 12, 16, and 20 in. in 28 in. rows did not differ significantly in yield.—G.K.G.C.

125 TOLMAN, B., and others. **Row widths and sugar beet production.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 282-6, bibl. 5. [Utah-Idaho Sugar Co., Salt Lake City, Utah]

The tests discussed were designed to investigate the effect on yield of row width and spacing in the row, both of which growers have tended to increase to facilitate mechanization and reduce hand labour. Replicated trials were conducted in Utah in 1945, in Utah, Idaho, South Dakota and Washington in 1946, and in Utah and Idaho in 1947. In all tests greatest yields of roots and sugar were obtained by thinning to 12 in. in rows 20 in. apart. Yields were decreased by various combinations of alternate narrow and wide rows averaging about 20 in. In the 1946 trials, spacing between 10 and 16 in. in the row had no significant effect on yield.—G.K.G.C.

126 DEMING, G. W. **The effect of variations in row width and plant populations on root yields and sucrose percentage of sugar beets at Fort Collins, Colorado.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 280-1. [Div. Sug. Plant Investigations, Agric. Res. Admin., U.S. Dept Agric.]

The replicated trial of which the results are briefly discussed, included row widths from 12 to 30 in. and plots with alternate rows of 20 and 40 in.; at each row width one plot was thinned to 12 in. between plants, and at some widths different thinning distances were used. At any row width different populations did not differ significantly in yield. Yield of roots and sugar, and sugar percentage tended to decrease with increased row width; the reduction from 20 to 24 in. rows was slight. The differences in yield from 30 in. rows and alternate 20 and 40 in. rows were not significant.—G.K.G.C.

127 DOXTATOR, C. W. **Sugar beet yields from varying row spacings and acre populations.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 276-9, bibl 4. [American Crystal Sugar Co., Rocky Ford, Colo.]

Replicated trials were laid out in 1946 and 1947 with sugar beet at nominal population levels of 22,000, 26,000 and 30,000 per acre in row widths of 20, 24 and 28 in. Sugar yield tended to decrease as row width increased. Sucrose percentage showed a tendency, not statistically significant, to increase with the population; it was independent of row width. Despite careful work it was impossible to secure full stands at the high population level, particularly in the 28 in. rows.—G.K.G.C.

128 BALDONI, R. Ulteriori esperienze sull'epoca di semina delle bietole. [**Further trials on the date of sowing sugar beet.**] *Industr. saccar. ital.* 1950, **43**, 121-7.

[See *Fld Crop Abstr.* 3, Abs. 171.]

An investigation into climatic conditions during March and April in various sugar-beet regions of Northern Italy showed that there are only short and variable dry periods suitable for sowing. The trials were continued in 1949 in the province of Bologna and Ravenna and the 1948 scheme was extended to include a sowing date at the end of February and another at the end of April and beginning of May. In 1949 climatic conditions were normal. The results confirmed that it is desirable to sow as early as possible. In comparing the behaviour of the plots sown on 24th February and 17th March, there appeared to be only a slight difference in the date of seedling emergence, but there was a considerably higher yield from the earlier sowing. The reduction in yield increased after March sowing. Information on harvesting dates and manuring is given.—E.B.

129 Barreiro, M. Remolacha azucarera. Posibilidades agricolas de su cultivo en la Republica Argentina. Primeros resultados. [**The possibility of cultivating sugar beet in Argentina. First results.**] [Contained in] Argentina, Ministerio de Agricultura, Reunión de comunicaciones, V°aniversario del Instituto de Fitotecnia, 1949, p. 19 [Rotoprinted]

Sixteen varieties of sugar beet were tested in 1948-49 at Balcarce. Klein Wanzleben from Holland gave the best yield about 41.3 tons of roots/ha. In trials of mechanized cultivation at Castelar, yield averaged 18.5 tons per hectare. In Rio Negro no attack of Yellow Wilt was observed.—E.B.

130 Ripper, W. E., and others. **A new systemic insecticide, bis (bis dimethylamino phosphonous) anhydride.** *Bull. ent. Res.* 1950, **40**, Pt. 4., 481-501.

A report of the chemical and physical properties and formulations of this new, selective insecticice is given. A formulation containing 66 % anhydride has a prolonged toxicity to aphids and red spider, but is innocuous to non-plant-sucking insects, notably parasites and predators, which keep in check any survivors. Repeated applications on sugar beet reduced *Myzus persicae* and *Aphis fabae* populations and retarded and reduced yellow virus infection. Although less toxic than Parathion, Paraoxon and HETP, it must be handled with care. A method of analysis for bis (bis dimethylamino phosphonous) anhydride in plant material is described. No trace of the insecticide was found in harvested sugar-beet plants which had been spray-treated during the summer.—E.B.H.

131 Kock, P. C. de, and Hunter, R. F. **A germination inhibitor from sugar beet.** *Nature, Lond.* 1950, **166**, 440-1. [Bot. Dept, Univ. Aberdeen]

See also *Field Crop Abstracts* 1, Abs. 1147. Details of the present work are to be published in full elsewhere.—M.H.

132 Sande Bakhuyzen, H. L. van de. Groei en productie van suikerbieten. I. **Growth and production of sugar beets. I.** *Versl. Landbouwk. Onderz.* 1950, No. 55.2, pp. 211, bibl. 35, [English summary, pp. 212-3]. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

A statistical analysis has been made of the figures obtained from the weekly sampling of some fifty sugar-beet experiment plots. Figures obtained from experiments by other workers have also been used, together with some from experiments conducted by the author from 1938 onwards. The treatise contains five chapters comprising an introduction and discussion of the growth phases of the beet, the growth proper, the unit rates of formation and the sugar production, and the growth factors determining the sugar yield. All chapter, table and diagram headings are given in English as well as in Dutch, and there is a very full English summary from which the following is quoted: "The results of our investigation justify the two fundamental concepts which were advanced in this paper: (1) the concept of the three growth phases in which the course of development of the sugar beet in the first year could be subdivided; (2) the concept of the physiological distribution between sugar, water and (w-s)*, and between dry and fresh weight of beet or leaf. This distribution was found to be constant within one phase, but to change rather abruptly as the next phase is entered. In this way three straight distribution lines arise, each having a different slope." The phases mentioned under (1) are those of leaf formation (up to July 20-30), of beet formation (July 20-30 to August 20—September 20), and of ripening (August 20—September 20 until the end of the season).—G.M.R.

* (w-s) = the non-sugar dry weight of the beet.

133 Johnson, W. C., and others. **Soil factors influencing sugar contents of sugar beets.** *Nebraska Univ. Agric. Exp. Sta.* 62nd Annual Report. pp. 12-3.

Results of trials indicated that low sugar content in sugar beet was associated with relatively high nitrification rates and high N content of the soil and relatively high soil content of exchangeable Na and total NaCl. The negative correlation between the exchangeable Na and total NaCl contents of soils, and low sugar content, was greater than that between the N content of soils and low sugar contents in sugar beet. It was concluded that the amount of easily nitrifiable material in soil directly influences the sugar content, but that the total N content of the soil affords the best means of predicting the average sugar content over a period of years. Phosphate applications increased the yield and sugar content. Where both N and P were applied, the sugar content declined in direct proportion to the amount of N applied. The P appeared to have little ability to counteract the detrimental effect of N. It was considered probable that the low sugar content of sugar beet associated with certain soils of western Nebraska is a result of their relatively high content of exchangeable Na and total NaCl contents and their relatively high capacity to produce available N throughout the growing season. [No data of these trials are given.] —P.J.B.

134 Vyšinskiĭ, A. M. [**The effect of granulated fertilizers on the yield of cereal crops and sugar beet.**] [Russian] *Soviet Agron.* 1950, **8**, No. 8, 18-25. [Ukrainian Res. Inst. Soc. Agric.]

Data from experiments and farm practice show the value of granulated superphosphate and its superiority over ordinary superphosphate for sugar-beet and cereal crops. Granulated fertilizers consisting of organo-mineral mixtures (NPK with finely divided peat) have also proved particularly effective in experiments with these crops.—R.P.J.

135 JOHNSON, H. P. H. **Application of liquid fertilizers at time of planting.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 291-3. [The Beet Sugar Development Foundation, Fort Collins, Colorado]

Various chemicals, in solution or suspension in water, were placed with the seed by a modified combine drill. They included an organic iodine compound, sodium hexametaphosphate, ground treble superphosphate, ammonium nitrate, and a proprietary nitrogenous fertilizer. They were applied at rates between 0.5 and 5 lb. per acre alone and in various combinations. When the plants were 4 in. high some benefit from low phosphate and from nitrogen treatments was observed. At harvest no significant differences in yield or sugar percentage were found. [It is not stated whether water was applied to the control.]—G.K.G.C.

136 BARMINGTON, R. D. **A press-wheel study to improve beet seedling emergence.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, pp. 225-8. [Colo. Agric. Exp. Sta., Fort Collins]

Drilling trials with various types of press wheel were made in dry soils at different points in the Rocky Mountain area in 1946, and in moist soils at Fort Collins in May and August, 1947. Emergence counts indicated that the deep concave press wheel was not the best type. The performance of the various types of wheel is discussed.—G.K.G.C.

137 BARMINGTON, R. D. **The relationship of seed and cell size to planter performance.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 240-50. [Colo. Agric. Exp. Sta., Fort Collins]

Diagrams are presented showing the relation of percentage cell fill to plate or rotor speed in a number of commercial drills, using decorticated seed. It is suggested that the use of more accurately graded seed, with closer size tolerance, would improve the performance of precision drills.—G.K.G.C.

138 MCBIRNEY, S. W. **Improvement of sugar beet seedling emergence by planter development.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 229-39.

Some thirty modifications or combinations of furrow openers or press wheels were used on sugar-beet drills at Fort Collins, Colo., in April and June, 1947. In confirmation of previous results, emergence was better at shallow (1 in.) planting depths early in the season; later in the season it was better at the deeper plantings (1.5 in. or 2 in.). In general, relative emergence with the various combinations were not consistent with results obtained in previous trials. Promising modifications included a sprocket wheel between two concave press wheels, and an offset fertilizer boot.—G.K.G.C.

139 TINGLEY, R. J. **Stands resulting from low-seeding rates of decorticated seed with a precision planter.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 221-2.

Decorticated seed was sown with a John Deere No. 66 precision planter at about 4, 6, 8 and 10 seeds per foot, corresponding to from 1.35 to 3.125 lb. per acre, in Fresno County, California, in October, 1947. The plots were irrigated after sowing. Field germination counts showed satisfactory emergence and distribution of seedlings.—G.K.G.C.

140 SILSOE, The National Institute of Agricultural Engineering. **Precision drilling of sugar-beet in America.** 1948, pp. 18. [Mimeographed]

A statistical account of American progress in breeding a variety of sugar-beet seed with fewer seed germs than the present natural seed so as to reduce labour in singling. An effective processing method has been developed (combined burr-reduction and decortication) as well as precision seeders capable of metering processed seed uniformly if this has been graded within a size range of two or three 64ths of an inch. The low percentage field germination obtained with the crop in this country is the chief obstacle to a greater reduction in hand labour by the successful use of machines for thinning. Some method of controlling the growth of weeds in proximity to the sugar-beet seedlings will also be necessary.—E.B.H.

141 TOLMAN, B., JOHNSON, R., and BIGLER, A. J., and others. **1947 mechanical thinning tests.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 214-20.

In the co-operative trials discussed, three seed rates were used: 3 to 4, 7 to 8 and 10 to 12 seeds per foot in 20 in. rows. At six sites in Idaho, Michigan, Colorado and Utah six replications of the following treatments were applied: hand-thinning, hoe-thinning, cross-thinning with 8 in. centres, cross-blocking with 8 in. centres followed by hand-hoeing to the final stand, cross-thinning with 12 in. centres, cross-blocking with 12 in. centres, cross-thinning with 16 to 14 in. centres, and a mechanical thinning method devised locally. Hand-thinning was delayed until the 10 to 12 leaf stage; other treatments were applied at the 4 to 6 leaf stage. For each treatment and seed rate the following data are given: yield of roots, per cent sucrose, stand count and labour used in hours per acre. For all treatments yield depended on seed rate, which did not affect labour requirements for mechanical thinning. There was little difference in yield between the mechanical treatments; cross-blocking with 8 in. centres gave a greater yield than cross-thinning, at a slightly greater cost in labour.—G.K.G.C.

TURNIP

142 TIDSSKRIFT FOR PLANTEAVL. Stat. Forsøgsr. i Plantekultur. Medd. No. 452. Forsøg med stammer af kålroer 1946-1949. [**Varietal trials with swede strains 1946-1949.**] *Tidsskr. Planteavl* 1950, **54**, 181-4.

In trials with 11 swede strains on four clay soil and six sandy soil locations, 8 strains were placed in the first-class category. The average yields of these 8 strains for all locations were headed by Wilhelmsburger, Trifolium X, with a dry matter yield of 91.2 hkg. per ha., followed by Bangholm, Wilby Øtofte X, 90.6; Bangholm, Øtofte X, 90.4; Wilhelmsburger, Øtofte X, and E, 88.1; Bangholm, Hinderupgaard X, 88.1; Rekord, Taastrupgaard X, 87.9; Grønhovedet, Hunsballe X, 87.3; Bangholm Pajbjerg X, 87.1 hkg. per ha. A short description of each of these strains is given. In trials during 1946-49 on soil heavily infected with club-root (*Plasmodiophora brassicae*), Wilhelmsburger, Øtofte X and E and Grønhovedet headed the yield averages of the 11 strains tested, with 57.1 and 54.1 hkg. per ha. of dry matter per acre. Tabulated data are given of the yield and agronomic characters of each of the 11 swede strains tested, at each of the 9 test localities for each of the four years of the tests.—P.J.B.

GENERAL

143 NILSSON-LEISSNER, G. Statens centrala frökontrollanstalts bestämmelser angående minimiavstånd till odlingar, som kunna innebära korsningsfara, vid utsädesodling av rotfruktsväxter, fodermärgkal, raps och rybs o. l. i och för statsplombering med kontrollodlingsbevis. [**The Swedish State Seed Testing Station's regulations concerning the minimum distances between crops consistent with the avoidance of the risk of crossing, in the production of the seed of root crops, marrow-stem kale, rape and rybs (*Brassica rapa oleifera*), and for state sealing with certificates of cultivation under controlled conditions.**]

FIBRES

COTTON

144 GODOY, C., Jr. Período crítico para o algodoeiro no clima paulista. [**Critical period for cotton in the state of São Paulo (Brazil).**] *Rev. Agric. Piracicaba* 1950, **25**, 329-36, bibl. 2.

In Piracicaba, as in the rest of the state of São Paulo, the climate is not ideal for growing cotton, which is better adapted to less humid regions. There are three main defects; i.e. (1) in December, when the cotton is in the second phase of growth, there is heavy rainfall, seldom less than 100 mm., which hinders development; (2) in January and February maximum flowering occurs but torrential rainfall in these months results in a loss of bolls, flowers and fruits according to the heaviness of the precipitation—a major defect; (3) in March, April and May, the period of maturation of the plants and dehiscence, heavy rainfall occurs in March, whilst April and May show a marked drop in temperature. A correlation exists between climatic conditions and the quotient $\frac{T}{C}$, where T = the monthly total mean daily temperatures in degrees centigrade and C = the total monthly rainfall in mm. The quotient was calculated for the months of January and February of the period 1914-1950. It is shown that when the quotient exceeded 4, the year was favourable to cotton production and, where less than 4, unfavourable. Since 1914, there have been runs of two favourable and two unfavourable periods, 1950 being the sixth year of the second unfavourable period. In conclusion attention is drawn to the difference between cotton and cereals in their rainfall requirements. A balanced system of cultivating these crops would counteract losses due to fickle weather.—N.G.S.

145 BALASUBRAHMANYAN, R. **Perennial cottons.** *Indian Cott. Gr. Rev.* 1950, **4**, 60-4, bibl. 2. [Dept Agric., Madras]

In India there are still three inferior perennial types of *Gossypium arboreum*, *nadam*, *podupathi* and *rozi*, which continue to be cultivated to a limited extent. *Nadam*, of Coimbatore, has the capacity to resist drought and stem weevil (*Pempherulus affinis*) and shows the lowest percentage of insect-damaged seed cotton at harvest. *Podupathi*, of Vizagapatam, is noted for its hardiness and fibre strength, while *rozi*, from Guzarat, is immune to root rot. These three perennial cottons are unlikely to be replaced in the near future by annuals with similar attributes, and no measures, short of legislative compulsion, can effectively ban their cultivation. This article discusses the working of the Cotton Pest Act in Madras and the desirability of advocating higher quality South American perennial cottons for general cultivation.—K.O.

146 STOKES, W. E., and others. **Sea Island and other long staple cotton.** *Florida Univ. Agric. Expt Sta.* Annual Report for the fiscal year ending June 30, 1948, pp. 49-50.

In trials to compare a number of Sea Island strains with Sealand 542, a cross between Sea Island and long-staple Upland cotton, the average yield of seed-cotton per acre for all the Sea Island strains tested was 720 lb., compared with 1080 lb. for Sealand 542; while boll numbers per lb. were 118 and 72 and the lint percentages 30.1 and 32.2, respectively. In limited trials with a mixture containing 20 % toxaphene and 40 % sulphur and another mixture containing 3 % gamma isomer of BHC, 5 % DDT and 40 % sulphur, both mixtures gave quicker kills and affected more insect species than did calcium arsenate plus 1 % nicotine, though their residual effects were slight. [No rates of application indicated.]—P.J.B.

147 ARNDT, C. H. **Cotton seed treatment.** *South Carolina Agric. Expt Sta.* 61st Annual Report for year ending June 30, 1948. 1950, 34-5.

Studies were carried out with 8 pathogens that infect cotton seed, to find out which of them cause acid-delinted cotton seed to rot, and also to determine the conditions under which the pathogens become destructive. The results showed that *Colletotrychum gossypii* and *Rhizoctonia solani* were capable of killing seeds and seedlings at both relatively low and relatively high soil temperatures. *Pythium ultimum* and *Thielaviopsis basicola* caused losses only at relatively low temperatures, confirming previous observations that *P. ultimum* may be a destructive pathogen when planting is followed by cool, moist weather. *Macrophomina phaseoli* infected seedlings only at relatively high temperatures and was not considered to be a destructive pathogen. *Fusarium vasinfectum* and *F. moniliforme* infected seed most readily at low temperatures, but did not cause serious seedling losses in the trials. *Xanthomonas malvacearum* produced lesions in the cotyledons of seedlings which germinated at high temperatures, but did not infect the hypocotyl, thus indicating that this pathogen will not cause damping-off, but may produce seedling blight.—P.J.B.

148 CHIAROMONTE, A. Per la difesa dell'agricoltura dagli insetti in Somalia. [**Protection of agriculture from insects in Somalia.**] *Riv. Agric. subtrop. e trop.* 1950, **44**, 57-64, bibl. 41, [English summary, p. 62].

The importance of insects is briefly examined with regard to cotton cultivation and to other crops.—E.B.

149 NAWAZ, S. M. **Development of cotton seed and lint during the second phase of boll maturation.** *Indian J. agric. Sci.* 1949, **29**, 61-88, bibl. 9.

Growth changes in seed and lint characters during the second phase of boll maturation were studied in two strains of *Gossypium hirsutum*, namely M-4 and Sind Sudhar. Samples were taken daily from the 18th to 36th day after flowering, for three consecutive years, 1942-44. A random sample of 200 seeds with lint was taken from each day's sample. The seeds and lint were separated by hand and the following characters studied: seed-weight per 100 seeds; lint-index (weight of lint on 100 seeds); ginning percentage; mean fibre length; mean fibre weight per unit length (whole fibre); mean fibre weight per unit length of middle section; maturity counts. Differential trends on seed-weight and lint-index were observed. At first (from the 18th day after flowering) the relative rate of growth of lint was high, followed by a rapid fall in the later stages. The relative growth-rate of the seed, though initially lower than that of the lint, was maintained with only a slight and gradual fall. The differences between the two growth-rates were less marked in M-4 than in Sind Sudhar. These fundamentally different growth trends of lint and seed were found to be independent of seasonal fluctuation in Lower Sind. Maximum ginning percentage for both varieties was found to coincide with the date of intersection of the seed and lint growth-curves (about the 27th day after flowering), falling by 2-4 % thereafter due to the discrepancy between seed and lint development. Mean fibre length increased appreciably up to the 25th day after flowering, this being more pronounced in the case of Sind Sudhar than M-4. Evidence that cellulose deposition occurred before the 19th day after flowering indicated that the lengthening and thickening phases of development overlapped for some time. Mean fibre weight of the middle section was more than the mean fibre weight per unit length of the whole fibre throughout the second phase of boll maturation. The relative growth of the former was higher than the latter for the most part. Maturity counts were 10 % higher in Sind Sudhar than in M-4. Although the maximum values were not reached till the 35th day after flowering, values approximating thereto were attained by about the 19th day.—N.G.S.

150 DASTUR, R. H. **Physiological comparison of American cotton plant in the Punjab and Sind.** *Indian Cott. Gr. Rev.* 1950, **4**, 1-25, bibl. 6. [Scheme for Cotton Physiol. Research, Indore]

A physiological comparison of the growth of the American cotton plant in South Sind and the Punjab was made to determine the effect of small differences in the climatic conditions of the two tracts on the various characters of the plants. Two Sind-American and three Punjab-American cotton varieties were grown on four different sowing dates at two centres in South Sind and at one centre in the Punjab. The following morphological and physiological characters were observed. (1) There was an earlier initiation of the fruiting branch in Sind than in the Punjab. (2) The time taken for the buds to develop into flowers was shorter by 6 days in Sind than in the Punjab. There was no difference in the boll maturation period of early and late varieties in Sind, but in the Punjab the late varieties took on the average 6 days more for the maturation of the boll. (3) Flowering was gradual in Sind and rapid in the Punjab, but as the total number of flowers produced per plant in the two areas was the same the duration of the flowering period was 1.5 months longer in Sind than the Punjab. (4) In the Punjab there was a progressive delay in the initiation of flowering from earliest to the latest variety, while in Sind all varieties came into flowering phase at the same time and the setting percentage of flowers was greater. (5) The relative growth rate of the American cotton plant was higher in Sind than in the Punjab especially during the reproductive phase. (6) The early drop in temperature and higher night temperatures during the fruiting period in Sind may have been responsible for the early initiation of the flowering phase and the rapid maturation of the crop respectively. It may be that the differences in the relative day and night lengths in the two tracts during the growing season is associated with a rapid rate of development in Sind.—From Author's summary.

151 LODEN, H. D., and others. **The effects of time and method of pollination on seed set in American Upland cotton (*Gossypium hirsutum*).** *Agron. J.* 1950, **42**, 560-4, bibl. 10. [Texas Agric. Exp. Sta., Coll. Sta., Tex.]

The following pollination methods were used in the experiments: 1. normal open-pollination; 2. normal self-pollination; 3. normal cross-pollination with foreign pollen; 4. emasculation, with foreign pollen applied at 5 a.m. on day of anthesis; 5. same as 4 with pollen applied at 5 p.m. on day previous to anthesis; 6. not emasculated, corolla opened and foreign pollen applied at 5 a.m. on day of anthesis; 7. same as 6, with pollen applied at 5 p.m. on day previous to anthesis. Data are given on: the time and method of pollination, the number of bolls set and seed production. Methods 4 and 5 were unsuitable for the production of hybrid seed as only 11.43 %and 5.71 %, respectively, of the pollinated flowers set bolls. Apparently the stigmas are not receptive up to four hours before anthesis, as indicated by the fact that only 0.03 % and 0.01 %, respectively, of the seed set by methods 6 and 7 was fertilized by foreign pollen applied at the same time as in methods 4 and 5. No significant differences in the number of seeds set per boll from pollen applied to stigmas at the normal time of anthesis were found between methods 1, 2 and 3. The application of foreign pollen to the stigmas of unemasculated flowers in methods 6 and 7 resulted in a significant increase in the number of seed set per boll, though the applied pollen did not set an appreciable number of seeds. The foreign pollen is considered to have enhanced the receptivity of the ovules to viable pollen reaching the stigmas at the time of normal anthesis.—P.J.B.

152 PETERS, R. W. **Mechanical harvesting of cotton in Queensland.** *Qd agric. J.* 1950, **71**, 197-205.

The modern cotton harvesters described and illustrated in this article offer a solution to the problem of shortage of manpower for hand-picking. Fields in which cotton harvesters are to be used should be well cultivated and freed of excessive weed-growth, sticks, stones and similar rubbish, all liable to cause a breakdown of the harvesters. The cotton should be planted with a space of 3.5 to 4.0 ft. between the rows.—K.O.

153 JEWITT, T. N. **Field nitrates in Gezira soil.** *J. agric. Sci.* 1950, **40**, 160-5, bibl. 11. [Dept Agric. and For., Anglo-Egyptian Sudan]

The results are given from two sets of soil-nitrate measurements at the Gezira Research Farm in five three-course rotations: cotton/fallow/fallow; cotton/sorghum/fallow; cotton/sorghum/sorghum; cotton/Dolichos lablab/fallow and cotton/sorghum/Dolichos lablab. The first set showed that in the first foot of soil there was a distinct tendency for nitrates to be depressed during the rainy season, this tendency being more marked in the more open rotations. This is ascribed to the washing down of nitrates. The second set of measurements showed accumulations in the second foot and a distribution consistent with downward movement. In the Sudan Gezira the yields of irrigated cotton were positively correlated with the amount of rainfall in the six weeks before sowing. From these trials it was indicated that this correlation was not due to increased nitrate in the top foot of soil at sowing time.—From author's summary.

FLAX

154 MONTANARI, V. Alcune considerazioni e dati sulla coltura del lino da fibra nel Veneto. [**Some notes and data on fibre flax cultivation in the Venetian area.**] *Agricoltura Venezie* 1947, **1**, 128-36.

Since 1936 flax cultivation in the Venetian area has been developed on an industrial scale. In 1942 the total area under flax was 2752 ha. but it has decreased in succeeding years. The requirements of the crop are described. The seed, which is normally obtained from northern countries, rapidly degenerates if reproduced locally. The variety Riga Blue is the most successful. Information is given on yields of fibre and seeds, labour requirements and cultural methods, etc.—E.B.

155 WAGENINGEN, Netherlands. **Twenty-fifth descriptive list of varieties of field crops 1950. Flax varieties.** 1950, pp. 9.

A critical appraisal is given of the following flax varieties: Concurrent, Formosa, Hercules, Percello, Hollandia and Liral Crown. Comparative data of their agronomic characters are also given. —P.J.B.

156 BIRAGHI, A., and GAGNOTTO, A. Alterazioni su piante di lino trattate con insetticidi. [**Damage to flax plants treated with insecticides.**] *Ital. agric.* 1950, **87**, 391-4.

During the spring 1949, in a flax field of the Agro Romano, Italy, a great number of flax plants in the flowering stage presented a tumour on the collar which eventually caused the stem to separate from the root. These alterations were thought to be caused by insecticides of hexachlorocyclohexane type which had been distributed as a powder. This supposition was confirmed by a trial in which the same insecticides, and a few others, were tested at different concentrations. In some cases similar alterations were produced. The damaged tissues were examined histologically. It is concluded that hexachlorocyclohexane products may be harmful to crops if applied in too great quantity, or unevenly.—E.B.

HEMP

157 RAGAZZI, G. Raccolta e preparazione della canapa per il macero. [**Harvesting and preparing hemp for retting.**] *Humus, Milan* 1950, **6**, No. 8, 15-8.

158 GRUGET, E. A. El canamo. [**Hemp (*Cannabis sativa*).**] *Bol. Prod. Fom. Agric.* 1950, **2**, 2-32, illus.

A general account of *Cannabis sativa* and its cultivation is given. The following varieties are mentioned: common hemp; Piamonte; Bologna or Ancona hemp; China hemp or Tsingmá; Indian hemp; and Himalayan hemp. Hemp utilisation and industrial processes are described. The development of machinery in the USA for harvesting hemp is discussed. Estimated costs of hemp production, with and without machinery, and the cost of hemp grown for seed with hand labour are given. The official classification and grading of hemp fibres are set out. It is concluded that Argentina is especially suitable for the profitable production of hemp.—N.G.S.

JUTE

159 SEN GUPTA, J. C., and GITA SEN. **Effect of shortening the daily light period in the morning and in the evening, in short day treatment of jute.** *Curr. Sci.* 1950, **19**, 184-5, bibl. 2. [Bot. Lab., Presidency Coll., Calcutta 7.]

In the experiment with *Corchorus capsularis* and *C. olitorius* to compare the effect of shortening the daily light period in 8 hr. and 10 hr. light-period treatments, one set of plants was darkened in the morning beginning at sunrise and the other set in the evening ending at sunset. The flowering time was taken as the date of initiation of first visible flower bud and the fruiting time as the date of initiation of the first visible fruit. Plants of both species darkened in the morning 8 hr. treatment flowered later than those darkened in the evening, but there was little difference in plants given the 10 hr. treatment. Differences in the heights of plants at flowering were insignificant in the two types of treatment under each light period. Many of the plants exposed to darkness during morning hours showed a sickly appearance, their leaves not being properly developed towards their apices. Many of the leaves under the 8 hr. treatment were deformed by curling and were shed. *C. olitorius* plants were much more affected in this way than were *C. capsularis* plants. The results showed that when the darkening was in the morning hours the normal harmonious nutrition and growth balance of the plants was disturbed. The production of the flowering hormone was more retarded under the 8 hr. treatment.—K.O.

OTHER

160 GOLDSCHMIDT, W. B. **The stokroos: its chemical composition and probable fertilizer requirements in lowveld soils.** *Fmg S. Afr.* 1950, **25**, 29-30. [Subtrop. Hort. Res. Sta., Nelspruit]

The application of superphosphate in the row to both *Hibiscus cannabinus* and *H. braziliensis* resulted in earlier germination, faster growth and increased yield. More trials on the fertilizer requirements of *Hibiscus* sp. are required before full-scale fertilizer recommendations can be made.—K.O.

161 GREENWAY, P. J. **Vegetable fibres and flosses in East Africa.** *E. Afr. agric. J.* 1950, **15**, 146-53. [Systematic Botanist, E.A.A.F.R.O. Amani, Tanganyika Territory]

OIL CROPS

LINSEED

162 LAMAS, P. J. A. Resultados de las experiencias con lino realizadas en la Estacion Experimental Nacional de Colonia Mascias. [**Results of linseed experiments carried out at the National Experimental Station of Colonia Mascias, Argentina.**] *Bol. Prod. Fom. Agric.* 1950, **2**, 2-11.

The following varieties of linseed [*Linum usitatis-*

simum] were used: Benvenuto Labrador, Buck 3, Entre Ríos, Klein II, and Querandí M.A. Sowing was carried out in two periods, the first fortnight of June, and the second fortnight of July. Results are recorded for the years 1946/7, 1947/8, and 1948/9. Tabulated results compare: the weight of 100 grains; germination capacity; yield; acid to dry matter ratio; iodine index; susceptibility to *Fusarium lini*, *Sphaerella linorum* and *Melampsora lini*; and the days taken from germination to flowering, and flowering to maturity. The highest average yield over the three years was obtained from Querandí M.A. sown in the first period. The highest acid to dry matter ratio was obtained from Klein II. None of the plants was affected by *Fusarium lini*. Susceptibility to *Sphaerella linorum* was less in the linseed sown in the second period, and susceptibility to *Melampsora lini* less in the linseed sown in the first period. The total time taken to maturity was very similar (max. variation 2 days) in all varieties, though the linseed sown in the second period took 33 days less to mature. The results obtained are statistically analysed. In conclusion, it is recommended that the variety Querandí M.A. should be grown on soils infected with *Fusarium lini*, and that Klein II should be grown on fresh soils because, although the yields are not so high, the oil is of a much higher quality.—N.G.S.

163 Bosso, J. A. Comportamiento fenologico y constante térmica de sieta linos oleaginosos en La Plata durante el sexenio 1938-1943. [**The phenological behaviour and thermic constant of seven varieties of linseed at La Plata during the six years 1938-1943.**] *Rev. Fac. Agron. La Plata* 1949, **27**, 47-51.

This article is the summary of a thesis presented in 1944. The following seven varieties were tried: Poblacion Facultad; 330 M.A.; Buck 113; La Previsión 18; Buck 114; Klein II; and Buck 3. There was no correlation between the dates of maturity, sowing, and germination, for sowings between 5-16 August. The vegetative behaviour of these varieties, and the effect of climate thereon, is recorded for the period of the experiment. The varieties showed highly significant differences in yield. Población Facultad gave the highest yield with a six-year average of 1169 kg. per ha.—N.G.S.

SUNFLOWER

164 Sellschop, J. **Sunflower varieties** [**in South Africa**]. *Fmg S. Afr.* 1950, **25**, 311 and 320. [Coll. Agric., Potchefstroom]

As a result of trials to make early maturing, semi-dwarf varieties available to growers, the varieties Jupiter and Mars were recommended for 1950-51 plantings. The varieties Pole Star and Southern Cross, which are early maturing and give satisfactory yields, will probably be on sale in 1951.—K.O.

RAPE

165 Anderson, G. Svalöfs Matador höstraps. [**Svalöf Matador winter rape.**] *Sverig. Utsädesfören Tidskr.* 1950, **60**, 380-4, [English summary].

Winter rape is the most important oil plant grown in Sweden. Svalöf Matador, bred for cultivation in the Swedish rape-growing district, where severe winters prevail, was placed on the market in 1949. Matador is a selection from Lembke's rape, from which it is distinguished morphologically by a somewhat stronger anthocyanin colouring at the time of ripening. It is distinguished from Senraps by having longer, more spreading pods, a lighter colour at ripening and black seed colour. Matador was tested in 40 trials from 1945 to 1949. In 33 trials on the mainland its average seed yield exceeded that of Lembke by 8 % and that of Senraps by 17 %. On Gotland (7 trials) the yield of seed was 5 % less than that of Lembke and 12 % more than that of Senraps. The average oil content, determined in 17 trials, was 47.3 % for Matador, 46.7 % for Lembke and 45.1 % for Senraps. The tendency to shedding is less in Matador than in Lembke's rape and Senraps.—R.P.J.

OTHER

166 Bagge, H. Forsøg med sorter af opiatvalmue 1914-47. [**Trials with varieties of opium poppy 1941-47 (Denmark).**] *Tidsskr. Planteavl* 1950, **54**, 81-91.

Trials were carried out at five locations in Denmark during 1941-43 to compare four blue-seeded poppy varieties of German origin. The highest average yields for the period were given by Mahndorfer, with 9.0 hkg. per ha., followed by Strubes 8.3, Eckendorfer 8.1 and Peragis Weihenstephan 8.0. The average crude-oil yields for the same period were 372, 348, 326 and 308 kg. per ha., respectively. In varietal trials during 1941-43, blue-seeded Mahndorfer was compared with three new Danish selections, blue-seeded Øtofte, blue-seeded and white-seeded Pajbjerg and the blue-seeded Dutch variety Mansholt. Yield averages for the period 1941-43 were headed by Mahndorfer, with 10.7 hkg. per ha., followed by Mansholt 10.0, blue-seeded Pajbjerg 9.6, Øtofte 9.2, and white-seeded Pajbjerg 8.4 hkg. per ha.; the average crude-oil yields for the same period being 460, 435, 395 and 372 kg. per ha., respectively. On clay soils, Mahndorfer outyielded all the other varieties in each year. On sandy soils, Mahndorfer was out-yielded in 5 out of 19 cases during the trials, and the order of yield of the varieties was more variable from year to year than on the clay soils. White-seeded Pajbjerg gave satisfactory yields on the sandy soils, as contrasted with its relatively poor performance on the clay soils. Short descriptive notes are given of all the varieties tested. There are data of the maturity and haulm yields of each variety.—P.J.B.

167 BAGGE, H. Artsforsøg med olieplanter. 1942-1949. [**Oil seed plant trials. 1942-1949.**] *Tidsskr. Planteavl* 1950, **54**, 107-14.

In comparative trials at Lyngby and Aarslev on clay soil and at Højer on peat soil during the years 1944-49, yellow mustard, summer rape, opium poppy and oil-seed radish yielded an average of 17.6, 14.3, 14.1, 12.1 and 15.0, 10.3 7.7, 9.5 hkg. per ha. of seed on the clay and peat soils, respectively. The average crude-oil yields in the same order of crops on the clay and peat soils were 451, 494, 551, 385 and 384, 356, 316, 315 kg. per ha. respectively, and their average crude-oil percentage contents for both soils 25.6, 34.5, 41.1 and 33.2, respectively. In trials at three locations during 1942-45, the average seed yields of oil-seed flax and safflower were 10.8 and 8.5 hkg. per ha., respectively. Summer rape and oil-seed radish were cultivated in the same manner as yellow mustard, but suffered more from insect pests and fungus diseases than the mustard. Opium poppy required thinning out and also cleaner land than the cruciferous crops, but was only rarely attacked by insect pests.—P.J.B.

168 TODARO, F. La senapa bianca. [**White mustard.**] *Humus, Milan* 1950, **6**, 24.

The use of *Sinapis alba* as a forage- and oil- producing plant is discussed. This abstract also appears in *Herb. Abstr.*—E.B.

OTHER CROPS

169 MONTEIRO, R. F. R. *Oxytenanthera abyssinica* Munro. Um bambú africano. Subsidios para o conhecimento do seu valor na indústria de Celulose. [***Oxytenanthera abyssinica* Munro. An African bamboo. Its potential value to the cellulose industry.**] *Agron. Angolana* 1949, **2**, 59-73, [English summary, p. 73].

LAND USE, SURVEYS AND MANAGEMENT

170 KEEN, B. A. **Economic and social aspects of co-operative and collective farming systems.** *Bull. agric. Congo belge* 1949, **40**, 2451-5. [E. Afr. Agric. For. Res. Organization]

The possibility of raising native agriculture in Africa from its present primitive state is examined. Reference is made to some schemes adopted in the Middle East and in North Africa.—E.B.

171 BUNTING, A. H. **Technical aspects of the East African groundnuts organization.** [Paper read at the Proc. Assoc. Appl. Biol. Annual General Meeting, held in London on 24 March, 1950.] *Ann. appl. Biol.* 1950, **37**, 699-704. [Overseas Food Corp.]

The subject is discussed from the following aspects; world food needs and the geographical setting of the scheme; vegetation and soil types; experimental crop studies; crop mechanization; plant protection; and problems of organization.—M.H.

172 MUIR, J. **Notes on the agenda.** *Bull. agric. Congo belge* 1949, **40**, 2155-6. [Dir. Agric., Tanganyika]

Some suggestions are given for land management in parts of Tanganyika Territory where the soil is heavy in the wet season and extremely hard in the dry.—E.B.

173 HUNGERFORD, Doreen. **The Australian rice harvest.** *World Crops* 1950, **2**, 498-501, illus.

A survey recently made of the possibilities of large-scale rice production in the Kimberley District of Western Australia and the Darwin-Katherine area of the Northern Territory showed that large areas could probably be used for growing rice without artificial irrigation. It was reported that normal rainfall and seasonal flooding of areas near Darwin, Wyndham and Derby would provide sufficient water for rice cultivation. Suitable conditions are also reported along Queensland's eastern seaboard from Cooktown to Southport. Rice has been successfully grown in Australia since 157 acres were sown in 1924 in the Murrumbidgee Irrigation Area. The average amount of water used for irrigation in that area is about 6 acre-feet per season. There are many thousands of acres suitable for rice growing in the Murrumbidgee-Benerembah and Wakool-Tullakool areas. Only 25-30 % of the former is cultivated in a season, due to rotational practices, while the sowings in the latter area are governed by the capacity of the channel system. The soil in the Murrumbidgee Irrigation Area is shallow, medium to heavy clay overlying a stiff clay subsoil. The average yield of the last 11 years was 1.8 tons (over 90 bushels) of paddy per acre. Good crops of wheat and oats are also obtained from the rotation, which is coupled with fat lamb production. The rotations vary from three to eight years. Improvement work has resulted in the development of the varieties Caloro II (mid-season) and Late Caloro. The varieties Colusa 177 and a Lady Wright × Caloro crossbred also show great promise. Cultivation practices are described. The rice beetle (*Laius femoralis*) is controlled by fluosilicate dust and DDT. Birds cause depredations to the crops. Weeds, especially *Typha muelleri*, *T. augustifolis* var. *Brownii*, *Echinochloa crus-galli*, *Panicum colonum*, and rushes and reeds are a serious problem. They are controlled by submerging them under water, harrowing, or sheep grazing. Harvesting is done by headers with 8-12 ft. cuts. A common practice is to open up the crops with fore-cut headers, in order to avoid the damage which occurs where the normal side-cut headers are used. The area to be sown, the supply of irrigation water, and the disposal of the crops are controlled by the Australian Rice Marketing Board, in consultation with the Water Conservation and Irrigation Commission, and the rice growers.—N.G.S.

174 EECKHOUT, L. E. Monographie agricole de la région d'Ikoma (Kivu). [**Agricultural monograph of the region of Ikoma (Kivu, Belgian Congo).**] *Bull. agric. Congo belge* 1949, **40**, 2196-210.

The possibilities of colonizing and improving native agriculture in the country around Costermansville are studied. A distinction is made between land with scattered dwellings, where almost no fallowing takes place, and open land where cultivation on soils previously under pasture is followed by a fallow period of varying duration. Agricultural improvements in progress, or under consideration, are explained. These include the planting of hedges for erosion control, the improvement of food crops by selection, pasture improvement (kikuyu grass, *Paspalum*, and *Pennisetum* are mentioned), strip cropping and crop rotation. —E.B.

175 MICHOTTE, A. Mise en protection et aménagement agricole du Haut-Ituri. [**Protection and agricultural management of the Upper Ituri (Belgian Congo).**] *Bull. agric. Congo belge* 1949, **40**, 2263-7.

The programme which is being carried out includes the establishment of forest belts for protection against fire and wind erosion, and the carrying out of land surveys. It is necessary to establish the property of every family and to introduce improved cultural methods such as rotation of crops and grazed fallows.—E.B.

176 LOECKX, M. A. Plan de cultures de la famille Jupaliri (De la chefferie Djukot, dans le Kibali-Ituri). [**Cropping plan of the Jupaliri family of the Djukot district (Kibali-Ituri, Belgian Congo).**] *Bull. agric. Congo belge* 1949, **40**, 2279-315.

177 VIGUIER, P. Notes sur les essais de vulgarisation d'une agriculture rationelle au Soudan français. [**Attempts to popularize rational agricultural methods in the French Sudan.**] *Bull. agric. Congo belge* 1949, **40**, 2257-62. [Office du Niger]

Cultivation in this region was at one time carried out by hand hoe, but during the last twenty years agriculture has developed through the use of the plough. Of about 8000 ploughs in the French Sudan, over three-quarters are employed in the rice fields. Extensive agriculture is generally practised, tillage being independent of stock rearing. To avoid danger from having an excessive land area under cultivation, particularly in dry areas, rotation and manuring should be introduced. There are difficulties in the way of using farmyard manure. Green manure crops require mechanical cultivation and co-operative organization. They are mostly grown on the irrigated lands of the Niger. Only in a few colonized centres on dry land, e.g. M'Pesoba and Koutiala, where rainfall is 800 mm., have the natives adopted crop rotation and the use of farmyard manure, which is given to their cotton. The rotation is cotton/millet/groundnuts/fallow/millet/fallow.—E.B.

178 NAIDU, M. C. **Agricultural problems of the Tungabhadra Irrigation Project, Madras Presidency.** *Indian J. agric. Sci.* 1950, **19**, 263-75, bibl. 4. [Tungabhadra Project, Bellary]

The Tungabhadra Irrigation Project is designed to serve the districts of Bellary, Anantapur, Kurnool, and Cuddapah, all of which are subject to frequent famine. Experiments at the Agricultural Research Station showed that irrigation by itself produced no appreciable increases in yield of sorghum, *Setaria italica*, and *Gossypium herbaceum* var. Hagari I. In a series of sowing-date experiments at the same Station it was shown that early sowing had a beneficial effect on sorghum, *Setaria italica*, *Arachis hypogea* var. A.H. 25, and *G. herbaceum* var. Hagari. I. The author concludes that this demonstrates that factors other than irrigation, such as time of sowing, manuring, etc., require more consideration if crop yields are to be improved. Experiments showed that yields increased with manuring. A new experiment to discover crops and varieties suitable for the local black soil under irrigation showed that crops suitable for growth in the " mungari " season [May-July] are: sorghum, *Setaria italica*, *Eleusine coracana*, *Capsicum* *annuum*, *Zea mays*, and *Arachis hypogea*. Crops suitable for the "hingari" season [Sept.-Oct.] are: *Gossypium* spp. *Triticum vulgare*, *Zea mays*, and *Capsicum annuum*. By using irrigation over 8 months, it was found possible to raise two crops in one year. But trials of a double rice crop (*Oryza sativa*) showed that while the first year's response was good, the yield of both crops dropped considerably in subsequent years. A table sets out a cropping calendar for three seasons in use in a village near Siruguppa Research Station. Various combinations of crops which could be raised are shown. It is concluded that water for irrigation should be supplied from June to January, and should not be restricted to four months in either season.—N.G.S.

179 CANDURA, G. S. Meccanizzazione dell'agricoltura meridionale. [**Mechanization of agriculture in southern Italy.**] *G. Agric. Domen.* 1949, **59**, 283-4.

Data are given of the cultivated areas and the permanent pastures on plains, hills and mountains. During recent years a reduction has taken place in the area under permanent pastures with a corresponding extension of field and plantation crops. Trials in the Bari province have proved that mechanical methods can be used successfully for clearing the stony pastures of the region. This abstract also appears in *Herb. Abstr.*—E.B.

180 THORNTON, D. **Land-use adjustments for soil conservation in Tanganyika Territory.** *Bull. agric. Congo belge* 1949, **40**, 2157-63. [Soil Conserv., Tanganyika]

An account of the measures already adopted is given and some suggestions made for the future. In the territory there are some overcrowded areas but also a considerable extent of unoccupied land. Rice cultivation under irrigation, at present limited, is advocated. This would serve as a soil conservation measure and insure crops in years of low rainfall. Hill farmers should be encouraged to take up rice cultivation in the plains.—E.B.

181 LAMBARDI, N. Yemen: agricoltura e pastorizia, sfruttamento del regno animale e vegetale, denominazioni arabe locali. [**Agriculture and livestock-rearing in the Yemen (with local Arabic names).**] *Riv. Agric. subtrop. e trop.* 1950, **44**, 26-46, [English summary, p. 46].

182 WHITMORE, JOAN S. **The marginal areas of the Orange Free State. Pt. 1. Climatic study, Pt. 2. Climate and crop production, Pt. 3. Climate and the use of the land.** *Fmg S. Afr.* 1950, **25**, 23-8, 47-52 and 58, 85-9, bibl. 14.

After describing the climate of the area, the author outlines the moisture economy of the crops grown and their adaptability to conditions of drought, low temperature, etc. The crops include maize, kaffir corn (*Sorghum* sp.) wheat (mainly for green grazing), potatoes, soyabeans (for seed), cowpeas (for hay and ploughing in), peanuts, sunflowers, millets, Sudan grass and teff. Crop rotations and farming systems of the future for the areas Drakenberg Sourveld, Caledon Valley, Eastern Intensive Cropping Area, Central Free State Marginal Cropping Zone, Transition Grassveld and Southwestern Karoo are described. Recommendations are made for soil-moisture conservation.—K.O.

183 VOLLO, L. Le possibilità di attenuare i danni arrecati dalla siccità alla produzione. [**The possibility of mitigating drought damage to crops.**] *Agricoltura Venezie* 1948, **2**, 63-75. [Received 1950]

Since 1941 droughts have been more frequent in the Venetian area than ever before. Works for extending irrigation are under way, but will not be completed for several years. A rational regulation of surface and subterranean waters in the whole of the region would mitigate drought damage. The measures to be taken in this respect are examined.—E.B.

184 VISHER, S. S. **High temperatures and the seasonal distribution of precipitation and some ecological consequences or correlations.** *Amer. Midl. Nat.* 1950, **44**, 478-87. [Indiana Univ., Bloomington, Ind.]

A number of new maps are given which illustrate various aspects of precipitation and temperature in the USA. There is an extensive bibliography dealing with the ecologic significance of various climatic conditions.—P.J.B.

FARMING SYSTEMS AND PRACTICES

185 ALVORD, E. D. **Agricultural extension and demonstration methods amongst African peasant farmers.** *Bull. agric. Congo belge* 1949, **40**, 2468-76. [Dept Native Agric., S. Rhodesia]

The method adopted for teaching natives to improve their agriculture is explained.—E.B.

186 LAURENT, J. F. Amélioration par groupements indigènes de culture coopérative. [**Improvement through grouping natives for co-operative farming.**] *Bull. agric. Congo belge* 1949, **40**, 2211-22.

A scheme is advanced for improving agriculture and live-stock rearing in the Kabare area (Belgian

Congo) by grouping from 25 to 30 thousand people, progressively over five years. Each group will share a plough drawn by oxen or tractor. At present all work is carried out by hand. A demonstrative group was started in 1948 at Ludaha.—E.B.

187 VIGGIANI, G. La mia bonifica in difficili terre della Lucania. [**Land improvement carried out on difficult soils in Lucania.**] *Ital. agric.* 1950, **87**, 441-56.

An account is given of the achievements from twenty years' work for the improvement of two large agricultural properties at Potenza and Lavello, Southern Italy, originally under extensive cereal cultivation and natural pasture. The improvements carried out concerned soil and water regulation, irrigation, housing, live stock, etc.—E.B.

188 VIGUIER, P. Note sur le maintien de la fertilité des terres irriguées du Delta central du Niger. [**Note on the maintenance of fertility in the irrigated soils of the central delta of the Niger.**] *Bull. agric. Congo belge* 1949, **40**, 2040-3. [Office du Niger]

The area exploited includes 9000 ha. under rice and 6500 ha. under cotton. The recent construction of the Sansanding dam in Upper Senegal will allow of extended cultivation. A three years' rotation, cotton/millet/fallow, with farmyard manure given to the cotton, proved adequate to maintain fertility but manure is difficult to obtain. At present a two years' rotation of cotton and green manure, mainly *Crotalaria retusa*, is followed. *C. retusa* is also grown in rotation with rice in which case it should be given for 1 year in five. The cultivation of green manure crops is completely mechanized. Research is continuing to find more suitable species for green manure. A reported decrease in rice yields is thought to be due to weed invasion, mainly *Oryza barthii*. With regard to artificials, nitrogen fertilizers only appear to be effective in these soils.—E.B.

189 STOKES, W. E., and others. **Crop rotation studies with corn, cotton, *Crotalaria* and winter legumes.** *Florida Univ. Agric. Expt Sta.* Annual Reports for the fiscal years ending June 30, 1947, 1948 and 1949. p. 41 (1947); p. 39 (1948); p. 42 (1949).

In studies on the effect of different winter cover crops on the yield of subsequent summer crops, both peanuts and maize following *Melilotus alba* produced higher yields on heavily limed plots than when they followed lupins similarly treated; lime tended to depress lupin yields; peanuts following lupins on heavily limed plots gave only about 50 % of the yield of those on plots where the lupins had received 0 or 500 lb. per acre of lime. In trials to determine the effect of the date of turning under lupins on the yield of a following maize crop, maize yields were highest from lupins sown in October and turned under in the middle of February. In trials with different autumn-sown cover crops, the yield of shelled maize in bu. per acre was highest after *M. alba*, with 31.5, followed by blue lupin 30.0, oats 20.3 and natural vegetation 21.6. No fertilizers were applied in the trials. Late and early indigo (*Indigofera hirsuta*) and *Crotalaria lanceolata* were planted as cover crops in 1945 on deep Norfolk sand and fertilized once with 600 lb. of 4-8-4 NPK in 1945. In 1947, the yield of unshelled maize following late indigo was 23.1 bu. per acre, following early indigo 19.8, after *C. lanceolata* 21.9 and following natural weed cover 16.5 bu. per acre.—P.J.B.

190 THOMSON, J. R. **Farming by fire.** *World Crops* 1950, **2**, 396-7.

In the central region of the Sudan, between the Blue Nile and White Nile, there is a vast tract of heavy clay grassland mainly under two annual grasses, *Sorghum purpureo-sericeum* and *Cymbopogon nervatus*. The limiting factor, at the moment, to the development of this area is the lack of domestic water for the cultivators, and not rain for the crops. Parts of the area are cropped by the use of a system of controlled fire clearance. The annual grass seeds present on the soil germinate in August, the plants ripening seed by November. During the following season when the rains have penetrated the soil to a forearm's depth, usually by mid-August the mat of dead vegetation is fired. If this firing is timed properly, both the dead vegetation and the newly germinated seedlings are cleared from the land. The firing is immediately followed by the sowing of sorghum or sesame. After the food crop is harvested, the land is left for three or four years to allow a further cover of annual grasses to establish itself, prior to the next firing. The success of the system largely depends on the timing of the firing and the prevention of uncontrolled fires during December in the tinder-dry vegetation. With regard to timing, if the firing is done too soon, a second crop of grass seeds may germinate after the food crop is sown; if it is done too late, the growth of new grass may be too green to allow of proper burning. Uncontrolled outbreaks of fire in December, which render such cultivation impossible over large areas, have been successfully limited by a system of fire breaks. In the extensive system, fire breaks not less than 80 yd. wide are cleared for large distances across the direction of the prevailing northerly winds. In the intensive system, areas of uniformly suitable land for fire cultivation are surrounded by protective firebreaks. A system of fire-watching is also maintained. This method of farming should be compared with the Chitemene system of Northern Rhodesia.—P.J.B.

91 KINSEY, C. **Marginal land and pioneer cropping.** *Hereford. agric. J.* 1950, **12**, 21-7.
Iost of the Herefordshire marginal land is at an ltitude of 800-1000 ft. and unsuitable for rotaional cropping. Pioneer cropping has yielded good esults, especially where mixed farming (including heep) is practised. A mixture of 1 lb. turnips, -4 lb. rape per acre is suitable for fairly fertile oils, but two or more pioneer crops are recomnended for poorer soils prior to reseeding back to rass thus: turnips followed by rape and turnips, r by Italian ryegrass and turnips. It is an advanage on clean land to prepare the seed bed for rass without further ploughing. Notes on cultiations and fertilizers are included.—E.B.H.

92 THOMPSON, E. G. **Winter oats and barley.** *Farming* 1950, **4**, 345-8. [Nat. Inst. Agric. Bot., Cambridge]
The status of winter oats and barley in the farmng plan is subject to change. The author assesses he value of these two crops and concludes that vhereas the former is proving useful in the drier reas of Britain because of its earliness and frit fly esistance, yet the place of the latter in the farmng system is less certain. Neither winter crop is in ny way comparable to the spring varieties.—E.B.H.

93 RICHARDS, H. **Ploughing in combined straw.** *Hereford. agric. J.* 1950, **12**, 63-7.
Forage harvesters suitable for picking up, chopping nd returning combined straw to the soil in an asily ploughable condition are coming onto the narket, and mobile choppers, which can be drawn t the rear of any combine to chop and spread the traw as it leaves the shakers, are now available. Disc ploughs have also been used with success, nd where available and conditions allow, the deepligging type of plough deals with straw fairly well. Vith the 2-3 furrow general purpose or semi-digger lough wavy disc coulters are recommended. Another useful attachment is a trash guard, springoaded for up and down movement, which holds he straw on the ground for the disc to cut through. —E.B.H.

94 SYRIA, Ministry of Agriculture, Extension Service. Circ. No. 44. **The ten commandments of cereal growing.** [Hebrew] By *H. Najjar*. 1949, pp. 17, [English summary p. 1].

195 ELIASSON, S. Höstsäd ger 25 per cent högre kärnskörd än vårsäd. Några tankar inför höstsädessådden. [**Autumn-sown crops give a 25 % higher grain yield than spring sown. Some reflexions before autumn sowing.**] *Lantm. Svensk Land* 1950, **34**, 635-6.
Autumn sowings of wheat and rye give on the average approximately 25 % more grain than spring sowings: with oil crops the difference is much greater. Autumn-sown crops ripen early and thus spread labour requirement. They also assist in reducing erosion which, on many soils, particularly in south Sweden, is a serious problem. Other aspects discussed include nutrient supply, choice of crop, sowing dates and choice of variety. —R.P.J.

196 PASTRANA, J. A. La "oruguita-verde" (*Loxostege similalis guenée*) en cultivo de ceréales. [**The little green caterpillar (*Loxostege similalis guenée*) in cereal cultivation.**] *Memoria de la cuarta reunion de trigo, avena, cebada y centeno* 1950, 88-91. [Inst. Sanidad Vegetal, Argentina]
There are various methods of control, which include: destruction of invading host plants, especially *Amarantus chlorostachys*; cross-ploughing in winter to destroy the chrysallides; destruction of stubble, residues, etc; and, possibly, the application of BHC or DDT on the emergence of the first generation of caterpillars.—N.G.S.

197 HILL, K. W. **Speciality crops in Canadian irrigation farming.** *Agric. Inst. Rev.* 1950, **5**, 11-5.

198 MONTANARI, V. Lo sviluppo della meccanica agraria nelle Venezie. [**Development of mechanized agriculture in the Venetian area.**] *Agricoltura Venezie* 1948, **2**, 41-62. [Received 1950]
Data from an inquiry carried out in 1946 are presented.—E.B.

SOIL AND WATER CONSERVATION

99 WHYTE, R. O. **Soil conservation.** *Brit. Fm Mech.* 1950, **2**, 340-1.
summary of the methods and machinery involved n combating soil erosion.—E.B.H.

200 MICHELMORE, R. J. **Control of soil erosion.** *J. Dep. Agric. S. Aust.* 1950, **54**, 84-6.

201 COX, R. K. **The land use factor in wheatland erosion control.** *J. Soil Cons. Serv. N.S.W.* 1950, **6**, 159-70.

202 MAHER, C. **Economic and social studies in their relation to soil conservation.** *Bull. agric. Congo belge* 1949, **40**, 2439-45. [Dept Agric., Kenya]

Maize, cotton and flax are exhausting crops which leave the soil unprotected for long periods. *Eleusine coracana*, sorghum and beans give a medium soil cover. *Cajanus cajan* is deep rooted, protective and restorative. In many areas of Africa it is advisable to replace part of the arable crops by grass leys. In Kenya cassava has proved valuable on poor, eroded land. A grass cover tends to come back after three or four years under this crop. The possibility of extending rice cultivation under irrigation in the lowlands of East Africa is examined in relation to soil conservation.—E.B.

203 DELEVOY, G. Note relative à la conservation des sols au Katanga. [**Note on soil conservation in Katanga.**] *Bull. agric. Congo belge* 1949, **40**, 2119-22.

Conservation measures, which have been in operation for over 25 years, are briefly reviewed. One-third only of the soil in the agricultural concessions should be under cultivation ; the remainder should be under natural forest or fallow with trees. Measures have been taken to limit the practice of burning grasslands. This abstract also appears in *Herb. Abstr.*—E.B.

204 RENARD, M. La régénération des terres épuisées du Soudan français. [**Regeneration of the exhausted soils of the French Sudan.**] *Bull. agric. Congo belge* 1949, **40**, 2173-88.

In the whole of the French Sudan there is almost a complete absence of crop rotations. With the primitive methods of agriculture practised and an increasing population, soil fertility cannot be maintained. The possibility of introducing improved methods is examined, e.g. crop rotations, green manuring, using *Crotalaria juncea*, *C. retusa*, *Cajanus indicus*, and *Vigna catjang* ; soil covering and the use of mineral fertilizers. With present agricultural methods only 1/5th of the land should be cropped every year. Three climatic zones are distinguished : the Sahara, the Sahel and the Sudan proper. In dry farming the soil is exhausted after three to five years. Rice land under irrigation shows signs of exhaustion after ten years.—E.B.

205 BERMAN, R. W. **Conservation farming in New England with a farm grader.** *J. Soi Cons. Serv. N.S.W.* 1950, **6**, 196-202.

206 BROWNING, G. M., and SCHALLER, F. **Contouring in relation to crop yields and soil an water conservation.** *Iowa State Coll. Agric Exp. Sta.* Report on Agric. Res. for yea ending June 30, 1949, 102-3.

In trials over the period 1942 to 1948, inclusive maize, soyabean and oat yields from contoured and up-and-down cultivated land, on Ida an Marshall soils in Crawford County, Iowa, in bu per acre were : 78.5 and 69.3 ; 26.3 and 23.6 52.9 and 47.5, respectively.—P.J.B.

207 LETOUZEY, M. Feux précoces au Cameroun [**Early fires in the French Cameroons.**] *Bull agric. Congo belge* 1949, **40**, 1913-8. [Inspector of Waters and Forests, Frenc Cameroons]

The savannah in this region covers about 200,00 sq. km. It seems impossible to put an early end t the practice of periodical bush burning. Reason are given for the 1944 decision to allow early burning (at the beginning of the dry season) whic causes a minimum of damage. This abstract als appears in *Herb. Abstr.*—E.B.

208 WALKER, B. S. **Stubble burning.** *J. Soi Cons. Serv. N.S.W.* 1950, **6**, 209-10, bibl. 2

The author is of the opinion that while the incorporation of stubble into the soil is not the complete answer to the problem of maintaining fertility, the pursuance of a programme of continuou stubble burning must lead inevitably to a breakdown of soil structure, loss of fertility and increased erosion.—K.O.

209 HUSTON, J. J. **Reclamation of eroded arable lands in the Campden district (N.S.W.)** *J. Soil Cons. Serv. N.S.W.* 1950, **6**, 203-8.

210 MONTANARI, V. Le bonifiche venete in cifre [**Data on land reclamation in the Venetian area.**] *Agricoltura Venezie* 1947, **1**, 272-97 [Received 1950]

211 MARCHETTANO, E. Le opere di bonifica in alcuni importanti territori del Veneto. [**Land reclamation works in some important zones of the Venetian area.**] *Agricoltura Venezie* 1947, **1**, 298-316. [Received 1950]

WEEDS AND WEED CONTROL

12 ENGLAND and WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 47, N.A.A.S. **Stinging nettles.** 1950, pp. 4.

ethods are given for controlling and utilizing *rtica dioica*, a perennial with creeping rootstock ccurring in arable and grassland, and *U. urens*, an nnual which occurs mainly in arable land.—E.B.H.

13 WEST, E. **Nutgrass (*Cyperus rotundus*) control.** *Florida Univ. Agric. Expt Sta.* Annual Report for the fiscal year ending June 30, 1947, p. 96.

horough wetting with 2000 ppm of either the thyl ester or the sodium salt of 2,4-D eradicated 0 % of nutgrass plants on heavily infested plots, hough loose, dormant nuts were not affected.— .J.B.

14 TIDSSKRIFT FOR PLANTEAVL. Stat. Forsøgsv. i Plantekultur. Medd. No. 466. Forskellige kemikaliers virkning på ukrudtsplanter. [**The effect of different chemicals on weeds species.**] *Tidsskr. Planteavl* 1950, **54**, 164-7.

ata are given of trials to determine the effect of copper preparation, DNOC, and two growth- egulating substances, Types M and D, on the rowth of *Sinapis arvensis*, *Chenopodium album*, *triplex patula*, *Polygonum lapathifolium*, *P. con- olvulus*, *Stellaria media*, *Sonchus arvensis* and *irsium arvense*. The effect of the various her- icides on each weed species is briefly discussed. he two growth-regulating substances applied at ates of 1 kg. per ha. of active material were very ffective against *Cirsium arvense*. Of two dates of pplication, May 15th and November 6th, the late pplication was the more effective of the two and had a considerable residual effect during the llowing year.—P.J.B.

15 GOOR, G. A. W. van de. Onkruidbestrijding met behulp van synthetische groeistoffen. [**Weed control with synthetic growth-hormones.**] *Landbouw, Bogor* 1950, **22**, 141-81, bibl. 43, [English summary, pp. 180-1]. [An English version of this paper has been published as *Cont. Gen. Agric. Res. Sta.* No. 108.] [Inst. Agric. Res., Gen. Agric. Res. Sta., Bogor, Indonesia]

he following conclusions were drawn from experi- ents in the use of 2,4-D. The weeds *Borreria lati- lia*, *Ageratum conyzoides*, *Euphorbia prostrata*, *ynedrella nodiflora*, *Alternanthera sessilis*, *Com- elina nudiflora* and *Elephantopus scaber* can be ntirely eliminated; but *Mimosa invisa* and *ortulaca oleracea* are resistant to this weed-killer, hile the grasses, such as *Panicum* spp., *Imperata lindrica*, *Digitaria* spp., are especially resistant. or the complete control of *Lantana* spp. and *Cyperus rotundus*, several applications at one- or two-monthly intervals are necessary. The use of 2,4-D on groundnuts injures the crop. It is improbable that this weed-killer will be of value in other dry-farming crops, the principal weeds of which are grasses which are practically immune to 2,4-D, or even stimulated by it. Leguminous plants do not suffer from the application of 2,4-D and sometimes derive direct or indirect benefit from it. Comparisons of different methods of cultivation on the yield of irrigated rice and the development of weeds in the cultures showed that in only one case was yield significantly increased as a result of applying 2,4-D, which is useful principally for destroying non-gramineous water plants and the *Cyperaceae*.—G.M.R.

216 ZANINI, E., and BALLATORE, G. P. Risultati sull'impiego di erbicidi selettivi nella cerealicoltura siciliana. [**Results with the employment of selective herbicides on cereal crops in Sicily.**] *Boll. Giard. bot. Palermo* 1950 ? **19**, pp. 42, bibl. 16.

[See *Fld Crop Abstr.* 2, Abs. 1143]

Trails were continued in 1948-49 on 61 plots of 50 and 100 sq. m. each, under wheat and beans, with 27 control plots. Different doses of the herbicides were employed. The numerous weeds present in the plots are listed. The trials are separately described and conclusions drawn. 2,4-D amine, Weedone, Supersinox and Stirpan employed at the usual concentrations were effective only on some weeds and did not affect wheat and the wild grasses. The heterauxinic herbicides proved as a whole more effective than the chemical herbicides and 2,4-D amine more effective than Weedone. The mixtures of Sinox-Weedone and Stirpan-Weedone in water had a slightly depresssing effect on wheat. Treatment with bentonite powder employed pure or mixed with Sinox and Stirpan gave no result. It is concluded that treatment with herbicides is at present more expensive in Sicily than hand-weeding and does not eliminate all the weeds. The conclusions from these trials are not generally applicable.—E.B.

217 PRINCE, A. E., and LITTLEFIELD, R. **Weed control in oats.** *Maine Univ. Agric. Exp. Sta.* Bull. 473. Research for Maine farmers. Annual Report of progress year ending June 30, 1949, p. 37.

The triethanolamine salt, the sodium salt monohydrate and the isopropyl ester of 2,4-D, all at rates of 0.5 lb. of 2,4-D acid per acre, and a dinitro product, Sinox W, at a rate of 1 gal. of 13 % concentration per acre, were applied to oats undersown with clover, when the oats were 4 to 6 in. high, 6 to 8 in. high, at flowering, and at the milk stage. All weeds present in the oat crop appeared to be most susceptible to the herbicides at the 4 to 8 in. stage. The dinitro product, Sinox W, injured neither the oats nor the undersown clover when applied at the 6 to 8 in. stage. The 2,4-D sodium monohydrate salt did not injure the oats, but caused some injury to the clover. Both the triethanolamine salt and the isopropyl ester of 2,4-D damaged the oats, reduced the viability of the oat grain and in some cases killed the clover completely.—P.J.B.

218 ANDERSEN, S., and HERMANSEN, J. **Effect of hormone derivatives on cultivated plants. II. Spraying of cereals with 2,4-D and 4K-2M at different dates.** *K. VetHøjsk. Aarsskr. Medd.* No. 26. 1950, 141-203.

The experiments were made in 1948-49 in continuation of the 1947 experiments, the main object being to ascertain how the date of spraying affected the number and character of abnormalities. Spraying at certain stages of development involves a greater risk of abnormalities and probably a decrease in yield. In Rigel barley the susceptible stage lasts from the time when all the plants have two leaves and 25 % have three leaves until 75 % have four leaves ; in Stål oats from the time when all the plants have three leaves and 75 % four leaves until 25 % have six leaves. Strictly speaking this is true of Rigel barley and Stål oats only, but investigations with four varieties of barley and four varieties of oats indicate that it is approximately true of some other varieties grown in Denmark.—R.P.J.

219 ALTONA, R. E. **A preliminary report on the control of weeds in maize with Methoxone and 2,4-D.** *S. Afr. J. Sci.* 1950, **46**, 295-6. [African Explosive and Chemical Industries Ltd., Johannesburg]

An experiment was conducted to test two types of selective weed-killers at four different times of application on maize lands. The results showed that the three pre-emergence treatments kept down weed growth and increased the yields considerably over the control plots. There was no difference in effect between the two types of weed-killer used. Of the four different times of application tested, the two giving the best results were 5 days before and 5 days after planting. No detrimental effect was observed on the germination, growth, and grain formation of the maize in the three pre-emergence treatments.—From author's abstract.

220 LOUSTALOT, A. J., and DELGADO, R. F. **Weed control.** *Fed. Expt Sta., Mayagüez, Puerto Rico.* Report for 1949, 19-21.

The results of pre-emergence weed-control treatments on the yield of USDA-34 field maize, indicated that this variety could be grown successfully without cultivation under Puerto Rican conditions, following pre-emergence treatments of 12 gal. of Sinox plus 2.6 lb. of 2,4-D butyl ester per acre, or Santobrite at 43 lb. per acre. Santobrite was applied at rates of 20, 40 and 60 lb. per acre as a pre-emergence treatment following sowings of tropical kudzu (*Pueraria thunbergiana*). A good stand of kudzu was obtained without mechanical cultivation following the 20 and 40 lb. per acre treatments, but the 60 lb. per acre treatment injured the kudzu seed. Trials with a number of herbicides at different rates of application, indicated that nutgrass (*Cyperus rotundus*) was effectively controlled under high rainfall conditions by applications of Santobrite at 30 lb. per acre, or 2,4-D at 5 lb. per acre, both of which were applied three times at monthly intervals, though the elimination of *C. rotundus* led to its substitution by *Cynodon dactylon*. Areas heavily infested with *C. rotundus* were successfully planted with leguminous cover crops, such as velvet beans, without mechanical or chemical weed control. The legumes competed successfully by temporarily suppressing the *C. rotundus*.—P.J.B.

221 PIACCO, R. In risaia. Il diserbo chimico [**Chemical weeding in rice fields.**] *G. Agric Domen.* 1950, **60**, 119.

By using herbicides, it is possible to save up to 30 % on weeding costs. This figure, however varies according to the proportion of Cyperaceae and graminaceous weeds present. The latter can be eliminated only by hand. If Weedone 40 is employed for the former, the average quantity required per ha. is 1.5 to 2 kg. in 200/300 litres of water. See also *Fld Crop Abstr.* 3, Abs. 153.—E.B

222 BLACKMAN, G. E., and ROBERTS, H. A **Studies in selective weed control. 1. The control of annual weeds in winter wheat. 2. The control of annual weeds in spring cereals.** *J agric. Sci.* 1950, **40**, 62-81, bibl. 37. [Dept Agric. Univ. Oxford]

A comparison was made of the relative effectiveness of H_2SO_4, cupric chloride, dinitro-o-creso and two growth-regulating substances, 2-methyl-4-chloro-phenoxyacetic acid and 2 : 4 dichloro-phenoxyacetic acid, when applied in sprays (100 gal./ac.) for the destruction of annual weeds in winter wheat and spring-sown oats and barley The results obtained on various named weeds are given, together with recommendations showing the quantities of the various herbicides to be used in the field.—K.O.

223 DANSK FRØAVL. Hormonpræparater til bekæmpelse af ukrudt. [**Hormone preparations for the control of weeds.**] *Dansk Frøavl* 1950, **33**, 111-2.

Hormone herbicides may be used on cereal crops linseed and on many uncultivated areas. A list of sprays and powders, with directions for using them is given. Root crops are highly susceptible to these herbicides, as are yellow mustard, fibre flax, chicory, and white poppy.—R.P.J.

224 Thorup, S. Erfarenheter från ogräskampen i Danmark. [**Experience of weed control in Denmark.**] *Lantm. Svenskt Land* 1950, **34**, 445-6.

In Denmark, in 1949, spraying with herbicides was carried out on more than 200,000 ha. of cereals (barley, oats, wheat and rye) or on nearly one-fifth of the grain crop area. Danish and Swedish investigations have shown that cereals tolerate hormone preparations but that at a certain point in their development they are less resistant. Barley is most susceptible to damage when in three leaves and oats when four to five leaves have developed. Spraying should be carried out when spring cereal crops are beginning to tiller. Spraying of linseed with hormone preparations of the 4K-2M type having not more than 0.5 kg. of effective matter per ha. when the plants are 4 to 6 cm. high does not adversely affect seed setting.—R.P.J.

225 Clydesdale, C. S., and Hart, J. **Chemical weed control in grain crops.** *Qd agric. J.* 1950, **70**, 125-44.

This extensive and well-illustrated article deals with the various aspects of chemical weed control in Queensland from the standpoint of the selection, description and effects of the best herbicides for use on different grain crops and the spraying equipment needed. The various commercial spraying machines in use at the present day are described.—K.O.

226 Bakke, A. L., and others. **To develop new methods of control of annual weeds on peat and mineral soils at Crystal Lake.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949, 176-80.

Flax containing an average of 176 weeds per sq. yd. was sprayed with a number of herbicides when between 6 and 10 in. high. All the 2,4-D formulations used suppressed flax growth when applied at rates of more than 1/8 lb. of 2,4-D acid per acre, but in all cases the flax recovered and produced normal yields, except where 0.5 lb. of 2,4-D butyl ester per acre was used. The weeds in flax were effectively suppressed by both the butyl ester and sodium salt of 2,4-D used at rates of 0.25 lb. 2,4-D acid per acre. A mixture of Clinton oats and red clover was given pre-emergence spray 3 and 5 days after seeding with the butyl ester and triethylamine salt of 2,4-D at rates of 0, 0.5, 1.0, 2 and 4 lb. of 2,4-D acid per acre. The red clover was eliminated by the 2 and 4 lb. rates, 50 % was destroyed by the 1 lb. rate, but it survived the 0.5 lb. rate without serious loss. The 4 lb. rate caused considerable leaf roll in the oats, but these symptoms disappeared after 2 weeks. There were no significant reductions in oat yields for any of the rates and formulations used. Data are given of the effect of several amine salts and two esters of 2,4-D at rates of 0.5 and 0.25 lb. per acre, on maize yields in a weed-free field, the plants being sprayed when 30 to 40 in. high. The reaction of three inbred lines of maize to several 2,4-D formulations was studied. The plants were sprayed when 36 to 54 in. high. There were no significant differences between the 2,4-D formulations used in their effect on the maize, but the yields of the variety W 22 were seriously reduced, whereas the yields of WF 9 were not seriously affected. The need of caution in applying 2,4-D to foundation breeding stocks of maize, unless there are reliable data on the reaction of these stocks to 2,4-D is stressed.—P.J.B.

227 Meulen, J. G. J. van der. Over onkruidbestrijding, meer speciaal met 2,4-D. [**Weed control (in Indonesia), with special reference to the use of 2,4-D.**] *Landbouw, Bogor* 1950, **22**, 123-30, bibl. 19. [Fac. Agriculture, Bogor, Indonesia]

A description of the nature and physiological effects of 2,4-D is followed by a short account of its use in the USA, Canada and other countries. In Indonesia it appears to be of little importance for native agriculture, in which weeding is normally thorough and an integral part of the tillage process; but it may be of value for large mechanized estates in controlling, for example, the Water Hyacinth, *Eichhornia crassipes*, which often blocks irrigation canals.—G.M.R.

228 Woodford, E. K. **Experimental techniques for the evaluation of selective herbicides.** *N.A.A.S. Quart. Rev.* 1950, **9**, 1-10. [Agric. Res. Council, Univ. Oxford]

The evaluation of toxicity has three stages ; the determination of the degree of toxicity of the herbicide to the crop, to the weed, and to the crop and the weed in association. The final stage may raise complications by upsetting the ecological balance. A technique for field trials using a randomised plot lay-out is described. The size of the plot varies with the problem. A wide path has to be left between each plot because of the danger from drifting spray and dust. Toxicity in crops is generally assessed by yields, as in fertilizer experiments, although where growth-regulating substances are employed, morphological reaction often provides more accurate information. It is much more difficult to make an accurate assessment with perennial than with annual weeds. Owing to the inherent variability of biological material, the dosage mortality curve assumes a sigmoid form. It is thus more accurate to measure the concentration required to kill 50 % of the plants—this concentration being known as L.D. 50. The existence of more accurate methods for determining the concentration of herbicide necessary to obtain a 90-100 % kill is noted. The time allowed between pre- and post-emergence counts varies with the type of herbicide and weed. Contact types of herbicides are much quicker in action than growth-regulating substances. The interval before death should be as short as possible to eliminate complications. With perennial weeds, growth-regulating substances may take up to nine months to be effective. Complications then arise out of the underground spread of the weeds, regeneration from rosettes, and so forth. Thus the only accurate method of assessing the kill of plants is to mark all weeds counted at the time of treatment. Independent evaluations are made when crop and weed are treated in association. It is pointed out that many other factors such as stage of development, growth rates, climatic and soil environment also influence toxicity and selective toxicity, and that these effects must be studied before generalisations about the efficiency of a herbicide can be made. An appendix describes in detail an experiment with DNBP on peas, where *Stellaria media* was the prominent weed.—N.G.S.

229 BOLETIN DE PRODUCCION Y FOMENTO AGRICOLA. Pesos y medidas de las semillas de las malezas de los cereales y oleaginosas. [**Weights and measures of the weed seeds of cereal and oil crops.**] *Bol. Prod. Fom. Agric.* 1950, **2**, 33-8.

CROP BOTANY

230 CRANE, M. B. **The origin and improvement of cultivated plants. Pt. II.** *J. R. hort. Soc.* 1950, **75**, 465-74, bibl. 19. [John Innes Hort. Inst., Bayfordbury, Hertford]

231 BOTTINI, E. I microelementi nutritivi del terreno agrario. Nota 3. Prove di vegetazione in vasi Mitscherlich con boro, rame e cobalto. [**The nutritive minor elements of the soil. Note 3. Vegetation tests in Mitscherlich's pots with boron, copper and cobalt.**] *Ann. Sper. agr.* 1950, **4**, 895-917, bibl. 19. [English summary, p. 916]. [Sta. chim.-agr. sper. Torino, Italy]

The plants tested were oats, buckwheat, peas and flax. Among the effects reported from the addition of boron, copper and cobalt, were increases in the yields of buckwheat and flax, and a greater development of particular organs, e.g. leaves or fruit in all the plants. Copper often showed a tendency to lower the absorption of mineral substances from the soil and boron often a reverse tendency.—From author's summary.

232 RUSSELL, R. Scott, and MARTIN, R. P. **Studies with radioactive tracers in plant nutrition. I. Problems in the use of radioactive tracers. II. The estimation of radioactive tracers.** *J. exptl Bot.* 1950, **1**, 133-40 and 141-58, bibl. 53. [Dept Agric., Univ. Oxford]

Tracer methods can yield valid results only if the behaviour of the tracer within the plant is indistinguishable from that of the normal element. The extent to which radioactive isotopes satisfy this requirement must be considered from the following viewpoints: (a) their chemical and physical behaviour before disintegration; (b) the effects of new substances formed by their disintegration; (c) the effects of the radiation they emit.

Whereas, chemically and physically, isotopes with the exception of H^1 and H^3 satisfy this requirement, they may cause significant radiation damage even when supplied in low concentration if they are accumulated metabolically. The investigation of possible radiation effects is therefore an essential preliminary to all physiological investigations. The value of tracer methods is considered. Equipment and laboratory procedures for the electronic assay of P^{32} are described. For the assay of samples containing P^{32} a wet ashing method and the subsequent use of a liquid counting tube is preferred. Improvements of equipment to suit the requirements of plant nutritional studies are considered. Sources of experimental error are examined. On account of the decay of radioactive isotopes, the time factor may be of special importance in tracer work. Its effect on both experimental design and on laboratory procedures is considered. It is stressed that the scope and replication of large experiments, particularly if they are of long duration, may be subject to serious limitations. The importance of simplifying the equipment used in tracer assay and increasing its reliability is emphasized.—Authors' summary.

233 LAGERWERFF, J. V. De bepaling van koper in grond- en gewasmonsters. [**The determination of the copper content of plant and soil samples.**] *Landbouwk. Tijdschr.* 1950, **62**, 282-91, bibl. 45. [Imperial Agric. Corp. Hartford, Conn.]

This abstract also appears in *Herbage Abstracts.* The results of qualitative and quantitative tests are reported on the comparative value of using: (1) dithizone, (2) diethanolamine, (3) sodium diethyl dithiocarbamate, (4) dithio oxamide, and (5) potassium ethyl xanthate, in the colorimetric determination of the copper content of plant tissue. (1) was the most sensitive, but the least accurate, method. (2) was less sensitive but more accurate, quantitatively. Of the methods tested, (2) is preferred, since it is less sensitive to external oxidizing influences. Suggested methods for the preparation of plant tissues to be tested are given.—P.J.B.

234 ROBERTS, D. W. A. **Qualitative and quantitative determination of the wheat leaf carbohydrates.** *Canad. J. Res.* Sect. C. 1950, **28**, 754-9, bibl. 47. [Bot. Dept Toronto Univ., Ont.]

235 ROBERTS, D. W. A. **Nitrogen determination in wheat leaves.** *Canad. J. Res.* Sect. *C.* 1950, **28**, 745-53, bibl. 13. [Bot. Dept, Toronto Univ., Ont.]

A survey of the more promising modifications of the Kjeldahl method of nitrogen determination, indicated that the method in which mercuric oxide is used as a catalyst is the most satisfactory.—From author's summary.

236 GHOSH, B. P., and BURRIS, R. H. **Utilization of nitrogenous compounds by plants.** *Soil Sci.* 1950, **70**, 187-203, bibl. 21.

237 WAYGOOD, E. R., and CLENDENNING, K. A. **Carbonic anhydrase in green plants.** *Canad. J. Res.* Sect. C. 1950, **28**, 673-89, bibl. 20. [Bot. Dept, McGill Univ., Montreal, Que.]

Data are given of the carbonic anhydrase content of leaf extracts of 22 land and submerged aquatic plants, including barley, wheat, millet and sugar beet. The possible role of carbonic anhydrase in photosynthesis is discussed.—P.J.B.

238 PETERSON, J. B. **Relations of soil air to roots as factors in plant growth.** *Soil Sci.* 1950. **70**, 175-85, bibl. 55. [Purdue Univ. Agric. Exp. Sta., Lafayette, Ind.]

A brief synopsis of a wide range of literature covering the following aspects: the effect of aeration on crop response; the physiologic effects of soil oxygen; the oxygen requirements of plants; the harmful effect of excessive soil CO_2 contents.—P.J.B.

239 VERVELDE, G. J. Verlies aan droge stof in het zaad van granen tijdens de rijping en narijping. **Loss of dry matter in the seed of grains during the ripening and after-ripening period.** *Landbouwk. Tijdschr.* 1950, **62**, 628-36, bibl. 16, [English summary, p. 635]. [Lab. Crop Prod., Agric. Univ. Wageningen, Netherlands]

In ripening grain, respiration continues after the translocation of dry matter to the seed has ended. Decrease in total dry matter content of the seed is demonstrated from the literature and from the author's own experiments, although on account of sampling errors the losses are not in all cases consistent. The decrease starts when the dry matter is about 70 % of the kernel weight, or at the late yellow-ripe stage. In the cases considered, the loss of dry matter varied from 1 to 4 %. The loss depends on the moisture content and temperature of the seed and the length of time it is exposed to conditions favouring respiration. Combine harvesting followed by artificial drying would eliminate losses incurred under other methods of harvesting. The decrease in dry matter affects yield comparisons when varieties having different times of maturation are cut on the same date—From author's summary.

240 TOMBESI, L., and TARANTOLA, Matilde. La composizione dei semi di alcune specie vegetali in relazione alle disponibilità idriche del suolo. Nota 2. [**The composition of the seeds of some species in relation to the water availability in the soil. Note 2.**] *Ann. Sper. agr.* 1950, **4**, 715-24, bibl. in text. [English summary, p. 724]. [Sta. chim.-agr. sper., Roma]

An account is given of chemical analyses of seeds from plants grown with different amounts of water. The species tested were *Arachis hypogaea*, *Phaseolus vulgaris*, *Brassica campestris* var. *oleifera*, *Linum usitatissimum*, and *Vicia faba*. Tables and graphs give the seed composition for each species. It is shown that: (a) there is a considerable increase in raw fats and raw protein when the supply of water increases; (b) the cellulose and the N-free extracts increase when the water supply decreases; (c) the saponification number of the fats of *Arachis hypogaea* increases when the water supply increases. It is pointed out, with regard to availability of water, that the behaviour of the soma is different from that of the seeds. In fact, as the water availability decreases, the raw fats and proteins increase in the stem, while they decrease in the seeds.—E.B.

241 RAGGIO, M., and RAGGIO, Nora M. de. Ensayo de viabilidad de semillas con cloruro de 2,3,5-trifeniltetrazol. [**Testing the viability of seeds with the chloride of 2,3,5-trifeniltetrazol.**] *Bol. Lab. Botanica. La Plata.* 1950, No. 3, 1-2, bibl. 7. [Mimeographed]

The chloride of 2,3,5-trifeniltetrazol was shown to be an effective reagent for determining the viability of vegetal embryos. Its use considerably shortens the time taken by the common methods. Seed is submerged in a 1:1000 aqueous solution of chloride of 2,3,5-trifeniltetrazol at a temperature of 20-25°C., in darkness. A chemical reaction results which colours the viable seeds red. The viability can be determined in four hours. Plants tried included *Ricinus communis*, *Phaseolus vulgaris*, *Vigna sinensis*, *Gossypium hirsutum*, *Hibiscus esculentus*, and *Helianthus annuus*. Of all the plants tried, only *Helianthus annuus* failed to show consistency in staining.—N.G.S.

242 Tombesi, L., and others. Attività catalasica ed energia critica su semi provenienti da piante a diverso regime idrico. [**Catalase activity and critical energy in seeds from plants grown with different water supplies.**] *Ann. Sper. agr.* 1950, **4**, 725-33. bibl. 3, [English summary, p. 733]. [Sta. chim.-agr. sper., Roma]

The theory leading to the concept of critical energy is explained. The plants tested were *Vicia faba*, *Linum usitatissimum* var. Marsich, *Triticum vulgare* vars. Mentana and Frassineto, *Arachis hypogaea*, and *Phaseolus vulgaris*. The following conclusions are drawn: (a) the catalase content of the seeds decreases when the availability of water in the soil decreases; (b) the catalase content is higher when the reserve substance of the seed is mainly fats; (c) with the exception of *Linum*, the critical energy of the reaction is higher when the water availability is low; (d) the critical energy is higher in seeds having a high fat content, it is lower in those rich in protein while it has an intermediate value in seeds rich in starch; (e) the critical energy increases when the catalase activity increases.—E.B.

243 Went, F. W. **The response of plants to climate.** *Science* 1950, **112**, 489-94. [Kerckhoff Biol. Lab., Calif. Technol. Inst., Pasadena]

The biologic variability of plants is discussed and, in the light of the basic purity of biologic material, the overriding importance of the effect of environmental variation from plant to plant on phenotypic variation is stressed. The functions and objects of the Earhart Plant Research Laboratory at the California Institute of Technology in the study of plant growth, under carefully controlled conditions, are discussed. An experiment illustrating the influence of photoperiod and night temperatures on the seed-set of tomato plants is described.—P.J.B.

244 Sen Gupta, J. C., and Mukherji, D. K. **Studies on the physiology of growth and development of mung** (*Phaseolus aureus* **Roxb.**) **(a) Effect of the time of sowing, (b) Vernalization and photoperiodism.** *Indian J. agric. Sci.* 1949, **19**, 207-54, pl. 2, bibl. 9, illus. [J.C.S.-G., Presidency Coll., Calcutta. D.K.M., Indian Agric. Res. Inst., New Delhi]

Two strains of *Phaseolus aureus* were used, I.P. 28 and Sona Mung. Selected seeds of uniform size were sown in earthen pots. Four equidistant seedlings were retained in each pot after germination. Six sowings of five pots for each treatment were made at intervals of 15 days from 15 August, 1945, with six additional sowings of I.P. 28 at intervals of 30 days from 26 October, 1944. Sown on 14 September, 1945, 20 plants were exposed to a short photoperiod of 10 hours per day, and a similar number to a long photoperiod of 14 hours per day. The additional light was provided by exposing the plants to a 200 C.P. electric light from the beginning of dusk for the required period. Measurements of growth for all treatments were made every 15 days. The results obtained are expressed in graphical and tabular form. Meteorological data are given, and their influence on the growth and development of the plants discussed. For all sowings from 15 August to 29 October, flowering time was shortened with the lateness of sowing Sona, but lengthened with the lateness of sowing I.P. 28. The vegetative growth of both varieties decreased with lateness of sowing in this period. From 26 October, 1944 to 25 March, 1945, time of flowering in I.P. 28 tended to increase till the 24 December sowing and then to decrease till the March sowing. I.P. 28 behaved as a long-day plant and Sona Mung as a short-day plant. The results of the vernalization experiment were inconclusive.—N.G.S.

245 Brown, R., and Broadbent, D. **The development of cells in the growing zones of the root.** *J. exptl Bot.* 1950, **1**, 249-63, bibl. 15. [Bot. Dept, Univ. Leeds]

Data are presented which show the change in volume, dry weight, respiration, and protein content of the cell during development from the meristematic to the mature fully extended state [in pea roots]. The data have been obtained by making serial sections of known thickness along the root, making the relevant observations on the sections, and relating the values obtained to the total number of cells in the sections. An apparatus is described for obtaining serial sections from a group of roots. It is shown that the weight of the wall, the protein content, and respiration all increase during extension, and the increases during active growth with respect to respiration and protein content occur in two phases. In the first the increases are large per unit increment in volume; in the second they are relatively smaller. When extension ceases, a third phase in the development of the cell sets in, in which respiration and protein content decrease slightly. The data show that the protein content and and the respiration in the meristematic cell are considerably lower than they are in the fully vacuolated cell.—Authors' summary.

246 BOSWELL, J. G. **Metabolic systems in the 'root' of *Brassica napus* L.** *Ann. Bot., Lond.* N.S. 1950, **14**, 521-43, bibl. 19. [Univ. Sheffield]

This is a study of the effects of possible intermediary metabolites on the respiration of root tissue from *Brassica napus* using the Warburg micro-manometric technique. It is concluded that ascorbic acid is oxidized by two systems, one of which appears to be a direct oxidase and the other a dehydrogenase. No evidence of peroxidase activity was secured. A substantial fraction of the total respiratory activity was insensitive to cyanide and azide. The biologically important organic acids were oxidized with the production of carbon dioxide. Glutamic and aspartic acids were metabolized with great rapidity, glycine and alanine much more slowly. A scheme integrating these results is outlined and compared with the respiratory systems existing in potato.—Author's abstract.

247 GOEDEWAAGEN, M. A. J., and SCHUURMAN, J. J. Wortelproductie op bouw- en grasland als bron van organische stof in de grond. **Root production in arable and grassland as a source of organic matter in the soil.** *Landbouwk. Tijdschr.* 1950, **62**, 469-82, bibl. 17, [English summary, p. 481]. [T.N.O. Agric. Exp. Sta. and Soil Res. Inst., Groningen, Netherlands]

Different indirect and direct methods of determining root production are described, and attention is drawn to sources of error inherent in some of them. A table shows the widely varying results obtained by some early authors in determining the root production of rye, winter wheat, oats and barley. The method generally employed at the T.N.O. Station, Groningen, is outlined [see *Herb. Abstr.* 20, Abs. 585, and 19, Abs. 1192]. A second table presents the average value, in quintals per hectare, of the air-dry weight of roots produced by twenty-one field crop plants in the uppermost 20 cm. of the soil. These values have been calculated from determinations made at the Groningen Station and by other workers. The following conclusions are drawn. Root production in cereals is relatively high, ranging from 14 to 31 q. per ha., and is higher in winter-sown than in spring-sown cereals. In roots and tubers, especially potatoes, root production is low. Of the annuals, rape gives good root yield, 29 q. per ha. According to the table, root production in the perennial legumes is high, lucerne leading with 57 q. per ha., and red clover (22 q. per ha.) being superior to white clover (14 q. per ha.), but the root weight of these plants generally depends on the age of the culture at harvest time. A study of root production below the 20 cm. level is discussed for eleven crop plants, with special reference to soil fertility and humus content. Figures are quoted from Gericke (*Bodenk. PflErnähr.* 1946, 37, 46) to show that root production may be increased by improving soil fertility. The root yield of grasslands is also discussed.—G.M.R.

248 TOMBESI, L. Produzione di sostanza organica e disponibilità idrica del suolo. Nota 1. [**Production of organic matter and the availability of water in the soil. Note 1.**] *Ann. Sper. agr.* 1950, **4**, 697-714. [English summary, p. 714].

The object of this research was to study how unit water consumption varies when the water available to the plant is gradually reduced, the highest supply of water in the trials being referred to as 100. The plant species studied included *Arachis hypogaea*, *Vicia faba*, *Phaseolus vulgaris*, and *Brassica campestris* var. oleifera. By studying this process from the mathematical aspect, it appeared that Mitscherlich's physiological-mathematical law cannot be applied in these cases. It was found that the ratio seeds to stem and leaves, etc. varies for the same species in relation to the water supply, the highest ratios corresponding to 60 to 80 % water supply. The curves of the graphs of unit water consumption in relation to water supply show a minimum value which indicates the point where a plant makes the best use of the water available to form dry matter. For every plant two such minimum values, which do not always coincide, are given, one for the whole plant and one for the seeds only. The best unit water consumptions were found with water supplies ranging from 60 to 80 %. Tables and graphs illustrate the behaviour of the various species.—E.B.

249 SIEGEL, S. M. **Plant growth inhibitors from red kidney bean seeds.** *Science* 1950, **112**, 754-5, bibl. 4.

250 DI PRIMA, S. Su alcuni effetti nocivi dell'esaclorocicloesano per le piante. [**Noxious effects of hexachlorocyclohexane on plants.**] *Ann. Sper. agr.* 1950, **4**, 307-20, [English summary, pp. 319-20]. [Bari, Agric. Exp. Sta.]

The inhibiting effects of eleven different doses of hexachlorocyclohexane on oats, lucerne, bean, wheat, maize, barley, pea, rye, soybean, sorghum, castor, and vetch were examined. The effects varied according to the species, dose, method of application, soil and environment.—E.B.

251 GREENHAM, G. G. **Studies on phytocides. I. Diurnal variation in effectiveness of Methoxone.** *Aust. J. agric. Res.* 1950, **1**, 148-55, bibl. 17. [C.S.I.R.O. Canberra, A.C.T.]

MISCELLANEOUS

252 SMITH, L. P., and GLOYNE, R. W. **Meteorology and the farmer.** *Weather* 1950, **5**, 375-7.

Co-operation between the farmer and the meteorologist and the application of existing knowledge can help solve many agricultural problems, e.g. irrigation questions; the design and siting of windbreaks and shelterbelts; the fullest use of marginal hill land, and the avoidance of crop failure by a statistical study of runs of successive crop failures, and knowledge of the limiting climatic conditions for any given crop.—E.B.H.

253 POST, J. J. Het weer en de hoge opbrengsten in 1949. [**The weather and the high yields in 1949.**] *Landbouwk. Tijdschr.* 1950, **62**, 556-60.

Summary of lectures delivered to the ecological and phenological study group of the Netherlands Agricultural Society in May, 1950.—G.M.R.

254 INGHAM, G. **The mineral content of air and rain and its importance to agriculture.** *J. agric. Sci.* 1950, **40**, 55-61, bibl. 18. [215, Union Park Gate, Pretoria, South Africa]

Evidence, both direct and indirect, has been adduced to prove that the air is sufficient both qualitatively and quantitatively to supply all the nutritional requirements of plants, independently of the soil or soil bacteria. The fertility of an undisturbed soil lies chiefly in the surface inch or two and is due to adsorption of plant nutrients from the air by organic and inorganic colloids, such nutrients being carried down to the roots of the growing crop by rain.—Author's summary.

255 MACHACEK, J. E. **An agar sheet method of testing the efficiency of seed treating machines.** *Canad. J. Res.* Sect. C. 1950, **28**, 739-44, bibl. 2. [Bot and Plant Path. Div., Sci. Service, Dept Agric., Ottawa]

Details are given of a method for testing the uniformity of distribution of fungicides on treated seeds. The seeds are placed on a thin layer of acidified agar jelly, which has been previously heavily dusted with spores of *Penicillium purpurogenum*. After two days incubation, the uniformity of the seed treatment can be assessed from the variations in the diameter of the zones of *P. purpurogenum* inhibition round the seeds.—P.J.B.

256 REDDY, C. S. **Seed treatments for the control of seed-borne and soil inhabiting pathogens.** *Iowa State Coll. Agric. Exp. Sta.* Report on Agric. Res. for year ending June 30, 1949. 171-2.

The seed of six flax varieties was treated with 1 oz. of New Improved Ceresan per bushel. In 19 replications, the average yield from plots sown with treated seed was 2.18 bu. per acre above plots sown with untreated seed. Dehulled Clinton oats were injured by seed treatments with New Improved Ceresan and Ceresan M when stored for six months after treatment; the grain yields from such seed averaged 6.5 bu. per acre lower than similarly stored untreated seed. Dehulled oats, seed-treated and stored for 3 days yielded 8.2 bu. per acre more than similar untreated seed. 8 plots of Earlyana and 6 plots of Lincoln soyabeans were sown with seed treated with Arasan S.F., Spergon, Panogen and Bioquin I. The average yield increases over plots sown with untreated seed were 19, 17, 15 and 14 %, respectively. In sandy soil, heavy watering reduced the efficiency of Bioquin I very little compared with Arasan S.F., Spergon, Phygon, Dow 9B and Panogen.—P.J.B.

257 ÅBERG, E., and FALL, S. Maskinell avräkning av stråsädeskärnor och större frön [**Mechanical counting of kernels and other larger-sized seeds.**] *Medd. Frokontrollanst., Stockh.*, 1950, No. 25, 50-8. [English summary, p. 58].

In Swedish seed-testing work mechanical counting of small seeds of cultivated plants for germination tests has been in use for some years. A description is given of a vacuum operated machine for mechanical counting of kernels and other large-sized seeds, the source of vacuum being a domestic vacuum cleaner. The counting plates are 16 cm. in diameter and have 100 holes each. Round holes proved better than oblong ones. For wheat, barley, rye and oats, holes of 1.2 mm. diameter are preferable. For vetch, the holes should be 1.6 mm. in diameter and for beet seeds 1.2 mm.—R.P.J.

REVIEWS AND REPORTS

In this section, notes under Reports, indicate the main investigations in the undermentioned reports, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

258 Blackie, W. J. **Agricultural research and policy in Fiji.** *Agric. J. Fiji.* 1949, **20**, 98-120, bibl. 21.

The history of the agricultural progress of Fiji is outlined and a proposed programme for future research is put forward.—K.O.

259 Ponsonby, C. E. **Brazil's cotton industry.** *World Crops* 1950, **2**, 507-10, illus.

This review consists largely of the substance of reports, in particular those of the International Cotton Commission of 1921 and the Agricultural Economist for the Office of Foreign Agricultural Relations at Washington, 1949. The methods of production are undeveloped, and improvement is handicapped by administrative difficulties.—N.G.S.

260 Medici, G. **Italy. Agricultural aspects.** 21 × 14, pp. 136. Bologna: Ediz. agric. 1950. Ital. lire 1000.

" This little book was published on the occasion of the 7th International Conference of Agricultural Economists [held at Stresa, Italy, in August, 1949] for the purpose of placing before the delegates some of the characteristic features of Italian agriculture."

Following a general picture of agriculture in Italy, descriptions are given of production, distribution of landed property, agricultural contracts and farm labour, land reclamation and irrigation. —E. BIASUTTI.

261 Azzi, G. Ecologia agricola. [**Agricultural ecology.**] 24 × 16, pp. 304, fig. 28, bibl. 192. Caracas (Venezuela); Editorial Elite, 1947, Bs. 5.

This book is a Spanish version of " Ecologia agraria " published in Italy in 1944 (see *Fld Crop Abstr.* 3, Abs. 662) but parts of it are more fully treated than in the original and a few more plants, mainly tropical ones, have been added.—E. BIASUTTI.

262 Vogt, W. La población de Venezuela y sus recursos naturales. [**Population and natural resources of Venezuela.**] 23 × 16, pp. 124, figs. 61. Caracas: Ministerio de Agricultura y Cria. 1949. [Panamerican Union, Conservation Section]

This work deals mainly with land utilization and erosion in Venezuela. Erosion is serious in many regions. Advice is given on soil conservation, which is neglected under present systems of land use. Reference is made to land classification, seven types being recognized according to their suitability for cultivation, pasture or forest. This abstract also appears in *Herb. Abstr.*—E. BIASUTTI.

263 **Australia,** Commonwealth Scientific and Industrial Research Organisation, Division of Plant Industry. Div. Rep. No. 7. **Plant collecting expedition to sub-tropical South America, 1947-48.** By *W. Hartley*. 1949, pp. 96. [Mimeographed]

Organised by the Division of Plant Exploration and Introduction, U.S.D.A., in co-operation with the Division of Plant Industry, C.S.I.R.O., Australia, the expedition spent 5 months collecting plants in northern Argentina, Uruguay, Paraguay, and southern Brazil. Most of this region has an annual rainfall exceeding 40 in., falling mainly in summer, and has little frost. It has homoclimes in parts of the coastal belt of eastern Australia. The vegetation is principally prairie and savannah, and cattle-raising on the natural pastures is the main industry. Material collected included varieties of cultivated and wild peanuts (*Arachis* sp.). The wild *Arachis* sp. included forms of promise as pasture plants and valuable as parent material for the improvement of the cultivated crop. Other promising pasture and forage plants in the collection are several species of *Desmodium*, *Stylosanthes*, *Paspalum*, and *Adesmia* and other indigenous grasses and legumes. Other interesting features of the report are an extensive bibliography, interesting illustrations and maps of the expedition, an inventory of plant collections and an index of generic and vernacular names.—K.O.

264 **Argentina,** Ministerio de Agricultura y Ganaderia. Memoria de la Cuarta Reunion de trigo, avena, cebada y centeno—31 de Mayo y 1° de Junio de 1950 en la Estación Experimental Pergamino. [**Proceedings of the fourth conference on wheat, oats, barley and rye—31st May to 1st June, 1950 in Pergamino Experimental Station (Argentina).**] Pergamino, 1950, pp. 259. [Mimeographed]

The greater part of this report deals with cereal pests and diseases, and with varietal susceptibility thereto. Abstracts of some of the papers presented appear elsewhere in this issue.—N.G.S.

265 **Basutoland.** Annual Report of the Department of Agriculture for the year ending 30 September, 1948. Maseru, pp. 34.

See **also** *Herb. Abstr.* 19, Abs. 286. A crop rotation designed to give four crops in three years is being tested. Maize is sown in October and harvested the following July. Peas follow in September, and are reaped in time for a following winter wheat crop in May. The wheat is harvested in November, and succeeded by a bean crop, sown in January and harvested in June.—N.G.S.

266 **British Guiana.** Administration Report of the Director of Agriculture for the year 1948. Georgetown, 1950, pp. 20.

An experiment station was opened for the Mahaicony/Abary Rice Development Scheme during 1948. Research on the mechanized production of rice is being undertaken. The best of the 1942 rice hybrids, tested over a period of five crop-years at Georgetown were: 54/42, 85/42, and 95/42. Double-ploughing resulted in an increase of about 350 lb. of padi per acre, but it is doubtful if the practice is economic. Rice cultivation and manurial trials were continued at Georgetown and Essequibo. The rice variety D52/37, first introduced to large-scale cultivation in 1947, has proved very successful.—N.G.S.

267 **British Guiana.** Administration Report of the Director of Agriculture for the year 1949. Georgetown, 1950, pp. 20.

See also Abs. 266. Experimental work continued. The rice varieties D.54-42, D.85-42 and D. 95-42 gave yields of 25, 23 and 27 bags [wt. per bag not stated] per acre when given their first field-scale test. The straw appears to be adapted to mechanical reaping, and the grain type is prominent. It was shown that the resultant increase of 2 bags of padi obtained by double ploughing does not warrant the cost. A five year experiment to compare the effects of pen manure and artificial fertilizers on rice, and also the advantages of double and single ploughing was laid down at Essequibo. At the Mahaicony/Abary Rice Experimental Station, water treatment applied to the growing crop to induce stiff straw produced no significant differences in yield or in lodging when administered at one, two, and three months after sowing. When harvesting was done at grain-moisture contents greater than 23 %, the loss in yields increased appreciably; results indicated that the optimum period for harvesting is when the grain has a 20-23 % moisture content. Seed harvested at high moisture content gave low germination results. Pre-germinated rice seed sown through water in sunny weather did not germinate, but was successful when sown through 6 in. of water during rains. Dry seed sown in water germinated when the water was run off after four days.—N.G.S.

268 **Canada.** Fort William District Experiment Substation and Dryden and Emo Illustration Stations. Progress Report, 1937-47. Ottawa, 1948, pp. 48.

The average crop yields from 6- and 8-year crop rotations at the Emo, Dryden and Fort William stations are given. Of spring wheats tested at Fort William, average yields for 1944-47 inclusive, were headed by C.D. 3296 with 41.3 bu. per acre, followed by Regent 37.2, Coronation 36.2, Saunders 34.6 and Thatcher 32.3 bu. per acre. Of the oat varieties tested, Ajax headed the yield-averages for 1943-47 inclusive, with 101.8 bu. per acre, followed by Beaver 97.8 and Vanguard 95.1 bu. per acre. In barley varietal trials, Byng headed the yield-averages for 1942-47 inclusive, with 73.4 bu. per acre, followed by Wisconsin Ped. 38, 70.7, Montcalm 70.2, O.A.C. 21 67.6, Plush 67.2, Galore 64.4 and Barboff 60.5 bu. per acre. Byng was consistently weak-strawed. Montcalm was superior in straw strength and malting quality to Wisconsin Ped. 38. Among field pea varieties, five-year yield-averages were headed by 2221-D, with 51.7 bu. per acre, followed by Early Blue 51.1, 1187-C 50-4, 1873-K 48.9, Chancellor 43.9 and Arthur 41.1 bu. per acre. Five-year winter wheat averages were headed by Rideau, with 61.8, Dawson's Golden Chaff 59.0, 1083-29. 146 55.5 and Kharkov 42.0 bu. per acre. Data are given of the leaf and stem rust infestation percentages for 1946 and 1947 of 13 spring wheat, 10 oat and 4 barley varieties. In trials to compare the yield of oats, oats-barley mixtures and barley, in terms of 5-years average yields of total digestible nutrients, barley alone (Wisconsin Ped. 38), gave the highest yield with 2563.5 lb. per acre, followed by the oats-barley mixture (seeded with equal weights of oats and barley), with 2383.1 lb. and oats (Ajax) alone, with 2141.4 lb. per acre. In the mixture the oats yielded 977.4 and the barley 1405.7 lb. per acre.—P.J.B.

269 **Cyprus.** Quarterly Review No. 22. 1st July to 30th September, 1950, Nicosia 1950. pp. 23.

INVESTIGATIONS REPORTED:

(1) Control of the cereal leaf miner [*Syringopais temperatella*] (p. 10).
(2) Cereal variety trials (wheat, barley, rice and maize) (p. 10-11, 21, 22).
(3) The effect of soaking wheat seed in phosphate solution (p. 11).
(4) Wheat fertilizer trials (p. 12, 23).
(5) Fertility of ploughed up lucerne (p. 13-14).
(6) *Hibiscus cannabinus*: date and spacing trial (p. 14).—N.G.S.

270 **Paris,** Organisation for European Economic Co-operation. **Agricultural Advisory Services in European countries. Report of a working party of experts.** 1950, pp. 234.

This report is one of a series of studies made by the

Food and Agriculture Committee of the O.E.E.C. with the object of contributing directly to economic stability by expanding agricultural production. It is designed to find ways of strengthening the farm advisory services in order to reduce the time-lag in putting the results of agricultural research into farm practice. The report is based not on official statements, but on the direct observations of a group of European and American experts, who studied the operation of the farm advisory services in fourteen countries of Western and Southern Europe. There is a general section giving the conclusions of the group on the basic principles necessary for an effective advisory service. The second part consists of an account of the organisation and functioning of the advisory services in each of the countries visited, with suggestions for their further improvement.—From extract.

271 **Groningen, Netherlands.** Commissie ter Bevordering der Suikerbietenteelt te Groningen. [**Commission for the Promotion of Sugar Beet Cultivation.**] Report for 1949. *Med. Inst. rat. Suikerprod.* 1949, **19**, 1-62.

The information presented includes: (1) Tabulated yields for the different regions. (2) Diseases and pests. (3) Field trials. These were concerned with (a) variety trials, (b) variety trials combined with experiments in planting-distance and number of plants per hectare: results are tabulated, (c) a trial of 56,000, 75,000, and 80,000 plants per hectare, in which the best yield was obtained from the highest number of plants, (d) manurial trial, using liquid manure, dung and nitrogenous fertilizer, (e) green manuring, using *Phacelia*, rye, turnips, and clover, together with other substances such as chaff, straw, farmyard manure, etc., (f) comparison of three methods of singling, in which little or no difference was observed in yield of roots and sugar, (g) comparison of three dates for singling, the earliest date (20th May) giving the best results. (4) Yellows and sugar beet seed growing. Seed grown in the northern provinces is less likely to be infected than seed grown farther south. (5) Weed control. DNC trials are reported. (6) Losses incurred, through topping and leaving sugar beet in the ground. Beet weight and sugar content were compared in beets which were topped and lifted immediately, and those lifted one, two and three weeks, respectively, after topping. Results were inconclusive, but there was a steady loss in sugar the longer the beets were left in the ground. (7) Mechanization of sugar-beet harvesting. A short account is given of some mechanical toppers, horse-drawn and tractor-drawn lifters and other implements. (8) Comparison of mechanical and hand harvesting. (9) Trials with the John Deere precision sower.—G.M.R.

272 **India.** Report of the Central Rice Research Institute, Cuttack, for the period September 1946 to end of June 1948. Delhi, 1949, pp. 17. [Received 1951]

273 **Industria Saccarifera Italiana.** La sperimentazione bieticola dell'anno 1949. Relazione della Commissione per l'incremento ed il miglioramento della coltivazione della barbabietola da zucchero. [**1949 experiments with sugar beet. Report of the Committee for the increase and improvement of sugar beet cultivation.**] *Industr. saccar. ital.* 1950, **43**, 47-52.

A brief account is given of the work of the Committee during the third year of its activity, detailed accounts having been given in the 1949 issues of this journal. The field trials to test fertilizers, cultural methods, insecticides, etc. were carried out by the Institute of Agronomy of the University of Bologna under the direction of Prof. Mancini. It is believed that, with the improvements recently introduced, the average yield of sugar per hectare will soon be 50 q.—E.B.

274 **Northern Rhodesia** Department of Agriculture. Annual Report for the year 1948. Lusaka, 1949, pp. 15.

In five years of wheat trials, the variety Punjab 8A gave consistently good yields. Sabenero, a more rust-resistant variety, Kruger Bearded, Wit Klein Koren, and Matopo were satisfactory, and the Kenya selections 117A and 294M 7 yielded well in areas where more rust resistance is required. Kaffir corn (*Sorghum vulgare*) breeding continued, *coriaceum* hybrids giving the highest yields. In groundnut trials for the Overseas Development Corporation, the varieties Natal Common and Virginia Bunch proved the best of those tested.—N.G.S.

275 **United States** Department of Agriculture. Report of the Federal Experiment Station, Mayaguez, Puerto Rico. Washington, 1949, p. 27.

INVESTIGATIONS REPORTED:

(1) Persistence of pentachlorophenate. By A. J. Loustalot and R. F. Delgado. pp. 18-9.

(2) Weed control. By A. J. Loustalot and R. F. Delgado. pp. 19-21. See Abs. 220.—P.J.B.

276 **Colorado** Agricultural Experiment Station. Sixty-second, Annual Report, 1948-9. Fort Collins, 1949, pp. 31.

INVESTIGATIONS REPORTED:

(1) Phosphate placement in the manuring of wheat, barley, alfalfa and sugar beet. Use is being made of radioactive phosphorus to determine the availability of several types of phosphate fertilizer when placed in different positions relative to the crops (p. 4).

(2) Fertilizer placement for sugar beet (p. 4).
(3) Effect of rotational alfalfa, grass and alfalfa/grass mixtures on subsequent maize crops. Grass plots gave a low maize yield and showed nitrogen deficiency. There was no significant difference between alfalfa and alfalfa/grass plots (p. 4).
(4) Effect of alfalfa on succeeding crops. Crops in a rotation without alfalfa showed nitrogen and phosphate deficiencies while crops in an alfalfa rotation showed much less nitrogen deficiency but an increased phosphate deficiency (p. 5).
(5) Residual effect on spring wheat of fertilizers applied in the first two years of a rotation (p. 5.)
(6) Manurial experiments on wheat (p. 5).
(7) Barley breeding for smut resistance (p. 6).
(8) Bean breeding for disease resistance (p. 6).
(9) Bean seed treatment for *Fusarium* root-rot. Dithane and two antibiotics show promise (p. 6).
(10) Weeding sugar beet. A new type of mechanical weeder has been designed (p. 8).
(11) Effect of 2,4-D on weeds. This has usually proved effective on bindweed, but not on Canadian thistle (*Cirsium arvense*) or white weed (*Chrysanthemum leucanthemum*) (p. 9).—C.W.S.H.

277 **Florida University** Agricultural Experiment Station. Annual Report for the Fiscal Year ending June 30, 1947. Gainesville, 1947, pp. 260. [Received 1949]
Annual Report for the Fiscal Year ending June 30, 1948. Gainesville, 1948, pp. 280.
Annual Report for the Fiscal year ending June 30, 1949. Gainesville, 1949, pp. 333.

These three annual reports are treated here as one triennial report. Page numbers quoted are for the 1947, 1948 and 1949 annual reports, respectively.

INVESTIGATIONS REPORTED :

(1) Peanut improvement. By W. A. Carver, and F. H. Hull. p. 41 ; p. 39 ; p. 42. See Abs. 101.
(2) Crop rotation studies. By W. E. Stokes, and others. p. 41 ; p. 39 ; p. 42. See Abs. 189.
(3) Corn fertilizer experiments. By F. H. Hull, and T. C. Skinner. p. 43 ; p. 40 ; p. 44. See Abs. 53.
(4) Corn improvement. By F. H. Hull, and W. A. Carver, p. 47 ; p. 43 ; p. 48. See Abs. 55.
(5) Nutrition of the peanut. By R. W. Bledsoe, and H. C. Harris. p. 50 ; p. 48 ; p. 51. See Abs. 105.
(6) Biology and control of cutworms and armyworms in Florida. By E. G. Kelsheimer, A. N. Tissot, L. C. Kuitert, and N. C. Hayslip. p. 118; p. 212; p. 76. See Abs. 63.
(7) Control of the lepidopterous larvae attacking green corn. By E. G. Kelsheimer, and J. W. Wilson. p. 123 ; p. 121 ; pp. 149, and 174. See Abs. 64.
(8) Insect pests and their control. By N. C. Hayslip, and W. D. Wylie. p. 181 ; p. 190 ; p. 184. See Abs. 117.
(9) Grain crop investigations. By R. A. Blair, and C. C. Seale. p. 195 ; p. 203 ; p. 199.
(10) Seed storage investigations. By R. A. Blair. p. 195 (1947) ; p. 204 (1948). See Abs. 58.
(11) Grain crop investigations. By W. H. Chapman. p. 212 ; p. 225 ; p. 216.
(12) Effect of environment on the composition of forage plants. [groundnuts.] By G. B. Killinger, and W. E. Stokes. p. 47 (1947). See Abs. 106.
(13) Sea Island and other long staple cotton. By W. E. Stokes, M. N. Gist, and P. W. Calhoun. p. 50 ; p. 49 ; p. 53. See Abs. 146.
(14) Nutgrass (*Cyperus rotundus*) control. By E. West. p. 96 (1947). See Abs. 213.—P.J.B.

278 **Georgia** Experiment Station, Sixty-first Annual Report, 1948-9. Experiment, 1949, pp. 79.

INVESTIGATIONS REPORTED :

(1) Cotton varieties. In a large number of tests, Empire yielded better than other commercial varieties. A wilt-resistant variety of Empire has been developed. (p. 11-3).
(2) Cotton seed treatment for seedling disease. A fungicide designated No. 5400 gave a significantly higher rate of seedling survival than was given by untreated seed (pp. 13-4).
(3) Maize hybrids. The white hybrid Georgia 101 has out-yielded other hybrids and varieties in almost every district but it is not recommended where there is danger of weevil infestation (pp. 14-7).
(4) Wheat breeding. A new variety, Chancellor, has been bred and issued for general planting. Besides its high yield, it is winter-hardy and has good straw and milling qualities (p. 18).
(5) Oat varieties. Several rust-resistant varieties have yielded well in trials. The best are Hastings 100 bushel, Terruf, Nortex, Victorgrain, and Fulgrain. Arlington, a new hybrid, is suited to the Piedmont and Mountain regions (p. 18).
(6) Soyabean varieties. Ogden, Roanoke, Acadian and C-N-S proved the best varieties for oil, while Gatan was the best hay and cover-crop type (p. 19).
(7) Sorghum varieties. Dwarf types for combine harvesting have been tested. Recommended varieties are Early Hegari, Martin's Combine Milo, Hegari, and Plainsman Combine Milo (p. 19).

(8) Time for sowing maize (p. 16).
(9) Manurial trials with peanuts (p. 21).
(10) Effect of stand per acre on yield of maize. Stands of 8000 to 10,000 plants per acre gave the highest yields (pp. 22-3).
(11) Effect of application of lime to cotton. Dolomitic limestone was superior to other forms of calcium and when applied at 3600 lb. per acre gave an increase of 81 lb. seed cotton per acre (p. 23).
(12) Peanut spacing. An experiment has shown that close spacing is essential and that with rows further than 30 in. apart with Spanish, or 36 in. with Runner or Virginia peanuts, the yields drop sharply no matter how close the spacing is within the row (p. 37).
(13) Control of peanut leaf spot. Carbamates have not proved so effective as sulphur or copper-sulphur dusts (p. 37).
(14) Field pea hybrids. Trials over three years have shown H277-19A to be an outstanding yielder and to be as resistant to disease as any other variety (p. 39).
(15) Cotton pest control. Many commercial mixed dusts have been effective against the boll weevil. Calcium arsenate failed to control it (pp. 42-3).
(16) Maize manurial, spacing and varietal trials in the Mountain Region (p. 69).—C.W.S.H.

279 **Iowa State College** Agricultural Experiment Station. Report on Agricultural Research for the year ending June 30, 1949. Ames, 1949. pp. 336.

INVESTIGATIONS REPORTED :

(1) Weed control in growing corn. By E. V. Collins, and R. A. Norton. p. 30.
(2) Storage and curing of corn. By W. V. Hukill and others. p. 33.
(3) Experimental plot studies of climatic and microclimatic effects on Iowa crops. By R. H. Shaw, and G. L. Barger. pp. 49-50. See Abs. 65.
(4) Varietal response to cultural methods with oats. By L. C. Burnett, and others. pp. 50-4. See Abs. 40.
(5) Varietal response to cultural methods with wheat. By L. C. Burnett, and others. pp. 54-5. See Abs. 16.
(6) A study of different varieties and strains of corn in different parts of Iowa. By J. L. Robinson, and G. F. Sprague. pp. 56-7.
(7) Soyabean variety and selection tests. By C. R. Weber, and M. Weiss. pp. 60-1. See Abs. 98.
(8) Flax. A study of crop production methods. By L. C. Burnett, and I. J. Johnson. p. 63.
(9) The development and increase of superior, disease-resistant varieties of oats. By H. C. Murphy, and others. pp. 66-8. See Abs. 39.
(10) The development and increase of superior, disease-resistant varieties of barley. By L. C. Burnett, and others. pp. 68-70. See Abs. 47.
(11) The development of superior disease-resistant varieties of wheat. By L. C. Burnett, and others. p. 70.
(12) Development of soyabean varieties superior in agronomic characters and composition of seed by hybridization and selection. By C. R. Weber and M. Weiss. pp. 70-1.
(13) The development of inbred lines and hybrids of corn resistant to the European corn borer and a study of the factors affecting resistance. By G. F. Sprague, and others. p. 78.
(14) Soybean production in relation to fertilizer applications and crop sequence. By L. B. Nelson, and A. J. Englehorn. p. 101. See Abs. 100.
(15) The effect of cover crops on the conservation of soil and water and on crop yield. By F. Schaller, and H. D. Hughes. pp. 101-2.
(16) Contouring in relation to crop yields and soil and water conservation. By G. M. Browning and F. Schaller. pp. 103-4. See Abs. 206.
(17) Rotation and fertilizer studies with corn, soybeans, oats, hay and green manure crops on Clarion and Webster soils at Ames. By A. J. Englehorn and W. H. Pierre. pp. 108-11.
(18) Liming and fertilizer investigations on the slowly-drained prairie soils of northeastern Iowa. By H. R. Meldrum, and others. pp. 115-9.
(19) Factors affecting the response of small grains to nitrogen fertilization. By L. B. Nelson, and L. Dumenil. pp. 128-30.
(20) The influence of pythiaceous and other fungi on seedling stands of legumes and other crops. By W. F. Buchholtz, and H. C. Murphy, pp. 164-5.
(21) Expediting the marketing of seed through improved testing procedures. By D. Isely, and others. pp. 191-2. See Abs. 41.
(22) Control of *Aphanomyces cochlioides* through cultural practice and development of resistant strains of sugar beet. By W. F. Buchholtz. p. 165.
(23) Interaction of water, growth, hormones and food supplies on the development of maize. By W. E. Loomis. p. 168. (See Project No. 944).

(24) Moulds in stored corn and their control. By G. Semeniuk, and others. p. 170.
(25) Seed treatments for the control of seed-borne and soil inhabiting pathogens. By C. S. Reddy. pp. 171-2. See Abs. 256.
(26) A comparative study of the disease resistant qualities and growth response of native and exotic maize and related Andropogoneae. By I. E. Melhus, pp. 172-4. See Abs. 60.
(27) A study of soybean diseases and their control. By J. M. Craill, and others. pp. 175-6.
(28) Synthesis and utilization of foods in maize. By W. E. Loomis. p. 176.
(29) To develop new methods of control of annual weeds on peat and mineral soils at Crystal Lake. By A. L. Bakke, and others. pp. 176-80. See Abs. 226.
(30) The cytochrome system in higher plants: application of radioactive techniques. By R. E. Marshall. pp. 197-8.
(31) Field and laboratory studies on the ecology and control of the European corn borer in Iowa. By H. M. Harris, and others. pp. 243-5. See Abs. 61.
(32) The pattern of attack and survival of the European corn borer on various plant growth stages and its relation to performance in testing inbred lines and hybrid combinations of corn for borer resistance, tolerance and susceptibility. By H. M. Harris, and J. H. Lilly. pp. 245-7.—P.J.B.

280 **Maine University** Agricultural Experiment Station. Bull. 473. Research for Maine farmers. Sixty-fifth Annual Report of progress for year ending June 30, 1949, Orono, 1949, pp. 83.

INVESTIGATIONS REPORTED:

(1) Field and silage maize variety trials. By R. M. Bailey, and B. E. Plummer, p. 25.
(2) Weed control in maize. By C. H. Moran, p. 37.
(3) Weed control in oats. By A. E. Prince and R. Littlefield, p. 37. See Abs. 217.
(4) Yields of sugar beet at Presque Isle. By G. L. Terman, and others, pp. 71-2.
(5) Sunflower trials. By C. H. Moran and B. E. Plummer, p. 72.—P.J.B.

281 **Nebraska University** Agricultural Experiment Station. Sixty-second Annual Report. Lincoln, 1949, pp. 147.

INVESTIGATIONS REPORTED:

(1) Erosion control and moisture conservation. By F. L. Duley, and others. pp. 5-8. Trials are reported comparing the effect of subsurface tillage and ploughing on the yields of wheat, oats and maize in different rotations on land at different levels of fertility. Partridge peas (*Chamaecrista fasciculata*) have proved useful as a volunteer legume on land under stubble mulch cultivation.
(2) Germination and growth of maize seedlings. By. T. M. McCalla, and others. pp. 8-9. Data are given of the reduction in germination and seedling growth of maize seeds following soaking in different concentrations of *Melilotus alba* extract and in coumarin solution.
(3) Soil factors influencing sugar content of sugar beets. By W. C. Johnson, and others. pp. 12-13. See Abs. 133.
(4) Commercial fertilizers for sugar beets. By H. F. Rhoades, and W. C. Johnson, pp. 13-4. An application of 65 lb. of N as ammonium nitrate at planting time either alone, or in combination with P increased sugar beet yields by over 1 ton per acre in 11 out of 25 trials; in only 7 cases were increased sugar yields obtained by the N applications, alone, or in combination with P.
(5) Relation of soil nitrification rate and nitrogen content of the corn leaf to corn yield. By J. J. Hanway and H. F. Rhoades, pp. 14-5. Data are given of the relation between the yield of grain and the nitrogen content of maize leaves, taken from moisture-fertility-spacing trials at North Platte in 1947.
(6) Corn improvement. By J. H. Lonnquist, and D. P. McGill. p. 18.
(7) Annual variations in corn yield and weather. By T. A. Kiesselbach. p. 19. Data are given of the correlation between the annual yield of maize and a number of climatic factors during 1902-48. The highest correlation was with evaporation during June, July and August, followed by mean seasonal temperature and relative atmospheric humidity.
(8) Sorghum improvement. By O. J. Webster. pp. 20-1.
(9) Improvement of small grains. By L. P. Reitz, and others. pp. 21-4.
(10) Cultural practices in winter wheat production. By T. A. Kiesselbach and W. E. Lyness. pp. 24-6.
(11) Soyabean varieties. By D. G. Hanway, and T. A. Kiesselbach. pp. 32-3.
(12) Improvement and testing of special chemurgic crops. By C. E. Claassen, and A. Hoffman. pp. 33-5. Brief notes on safflower, castors, sesame, perilla (*Perilla ocymoides*), flax, sunflowers and mustard grown as oil crops are given.
(13) Weed control research. By N. E. Shafer, and D. L. Klingman. pp. 35-7.

(14) Bean diseases. By M. L. Schuster. p. 50.
(15) Cereal diseases. By J. E. Livingstone. pp. 50-1.
(16) Sugar beet diseases. By M. L. Schuster. p. 52-3. Both spring and autumn applications [rates not given] of DD, chloropicrin and BHC (666) effectively controlled root knot nematodes; BHC alone showed considerable residual effect. Beet rust (*Puccinia aristida*) was noted for the first time in western Nebraska, especially near the alternate host, saltgrass (*Distichlis stricta*).
(17) Nutritive value of legume [soyabean] seeds. By R. Borchers, C. W. Ackerson, and F. E. Mussehl. p. 56. Autoclaving for 15 min. at 15 lb. per sq. in. pressure removed the trypsin inhibitor present in soyabean oil meal and soyabean seed.
(18) Castor bean oil meal. By R. Borchers. pp. 56-7.
(19) Maize rootworm [*Diabrotica* spp.] control and distribution. By E. Hixson, M. H. Muma, and R. E. Hill. p. 67.
(20) European corn borer control. By C. A. Sooter, and M. H. Muma. p. 67-8.
(21) Insect pests of sunflowers. By M. H. Muma, and R. N. Lyness. pp. 70-1.
(22) Sod webworms and cutworms on maize. By R. E. Hill, D. R. Scott and M. H. Muma. pp. 71-2.
(23) Grain drying with unheated forced air. By F. D. Yung and G. M. Petersen. pp. 103-5.
(24) Maize drying with heated air. By F. D. Yung and others. p. 105.
(25) Planting and irrigation studies with sugar beets. By L. Harris and others. pp. 124-5. See Abs. 121.
(26) Dryland crop rotations. By L. L. Zook, and M. Greenwood. pp. 129-30.
(27) Moisture-fertility-spacing experiment with irrigated maize. By P. Ehlers, and J. C. Adams. p. 132.
(28) Mechanization and cultural practices for sugar beets. By P. Ehlers and others. pp. 132-3.—P.J.B.

282 **Purdue University** Agricultural Experiment Station. Sixty-second Annual Report for year ending June 30. 1949. Lafayette, 1949, pp. 140.

INVESTIGATIONS REPORTED:
(1) A study of seeding rates and patterns of maize on high fertility land. By S. R. Miles, and H. Kohnke. p. 41.
(2) A study of nitrogen side-dressing on maize. By A. J. Ohlrogge and W. K. Robertson. p. 41.
(3) The effect of storage conditions on the longevity of seed maize. By A. M. Brunson. p. 42.
(4) The development by breeding and selection of adapted varieties and strains of soft winter wheat. By G. H. Cutler. p. 43.
(5) Influence of seed treatment on stand yield of soyabeans. By K. L. Athow, and R. M. Caldwell. pp. 46-7.
(6) The development by breeding and selection of adapted varieties of spring oats. By G. H. Cutler. p. 47.
(7) Influence on soils and crops of fertilization of cereals only, legumes only, or of all crops in a four year rotation of maize, soyabeans, wheat and clover. By L. L. Gee, and A. J. Ohlrogge. p. 66.
(8) Insecticide control of the European corn borer. By G. E. Gould. p. 84.
(9) Use of radiant energy and electric traps as a possible control for European corn borer. By H. O. Deay, and J. C. Taylor. p. 88-9. See Abs. 62.
(10) Enzymes in relation to seed germination. By D. M. Doty, L. S. Shenberger, and Selma Hicks. pp. 98-9.
(11) The chemical, physcial and nutritional properties of maize proteins. By E. T. Mertz, and A. D. Campbell. p. 99.
(12) Effect of manganese and other minor elements on some organic constitutents of crop plants. By S. M. Hauge, and others. p. 100.—P.J.B.

283 **South Carolina** Agricultural Experiment Station. Sixty-first Annual Report for year ending June 30, 1948. Clemson, 1950, pp. 102.

INVESTIGATIONS REPORTED:
(1) Cotton harvesting investigations. By G. B. Nutt, J. S. Evans, and W. A. Balk. pp. 15-9.
(2) Effects of varying rates of nitrogen fertilizers on yields of maize planted at different spacings. By E. B. Eskew. pp. 22-4.
(3) Field crop variety trials. By W. R. Paden, and E. B. Eskew. pp. 25-30. Data are given of maize, oats, wheat, barley, soyabean and grain sorghum varietal trials.
(4) Sesame wilt. By G. M. Armstrong and J. K. Armstrong. p. 33.
(5) Crotalaria wilt. By G. M. Armstrong, and J. K. Armstrong. pp. 33-4.
(6) Cotton seed treatment. By C. H. Arndt. pp. 34-5. See Abs. 147.
(7) A promising new oil crop [sesame]. By J. A. Martin. pp. 36-9. A brief note on work on the selection of non-shattering, high yielding types.
(8) Cowpea curculio control in sight. By D. Dunavan. pp. 45-6.
(9) Boll weevil investigations in 1948. By F. F. Bondy, and others. pp. 67-70.—P.J.B.

NEWS ITEMS AND NOTES

Great Britain

284 Royal Society of Arts. The prize of £500 and gold medal [reported in *Fld Crop Abstr.* 3 : 1041] was won by Dr. R. E. Slade of Bishops Stortford, Herts.—N.G.S.

International

285 The Scientific Council for Africa south of the Sahara has been established to investigate the utilization of science for the benefit of the sub-continent. The Governments represented are Belgium, France, Portugal, Southern Rhodesia, the Union of South Africa, the United Kingdom and its Colonies. The chief functions will be to suggest new subjects for research, to link scientific bureaux now working in this field, to facilitate transfer of scientific workers from one territory to another, and to suggest specialist conferences which will advance the interests of Africa. *Nature, Lond.* Vol. 166, No. 4227, p. 765, 1950.—M.H.

Australia

286 Overseas Food Corporation. The position of the Sorghum Scheme is reviewed. In 1948-9, 30,000 acres were planted with sorghum. What promised to be a bumper harvest was spoiled by frost, but 7000 tons of sorghum were produced. For 1949-50, 70,000 acres were under cultivation, 3000 acres being planted with sunflower to provide protein for pigs [pig-rearing being an integral part of the scheme]. Torrential rains interfered with harvesting, but 18,500 tons of sorghum had been got from half the acreage by Nov. 1950. So far £1,400,000 has been expended on the scheme; this includes outlay on 1300 pigs and 13,500 cattle. The Queensland Government is providing one quarter of the capital, up to a limit of £500,000, and has undertaken to acquire suitable land and lease it to the Corporation. Two main varieties of sorghum are grown, Kalo and Wheatland; these, being dwarf varieties growing to a regular height, are particularly suitable for mechanical harvesting. Experiments are being carried out with cultivation of sunflowers, cowpeas, and soyabeans. *New Commonwealth* November, 1950.—N.G.S.

Canada

287 The Division of Applied Biology of the National Research Council of Canada reports progress in the rapid and simple separation of erucic acid, which is a constituent of the fatty acids derived from the seed of rape and mustard, both of which grow readily in Canada. Erucic acid shows great promise as a raw material for the manufacture of soaps, waxes and lubricants, etc.—P.J.B.

Europe

288 Hybrid Maize. The cultivation of hybrid maize in Europe has expanded considerably in recent years. Preliminary tests with adapted United States hybrids, initiated by UNRRA and continued by FAO, showed promise and indicated that some of these hybrids might be grown with advantage in Europe. The report sets out some broad conclusions and recommendations with regard to the development of hybrid maize in Europe. A description is given of the hybrid maize programmes and of the development of these programmes in each of the eleven participating countries. This is a report of a group of American experts on hybrid maize in European countries. O.E.E.C., Paris, 1950.—E.B.H.

Italy

289 Sugar-Beet Conference. This conference took place at Rome and Florence from 29th May to 6th June, 1950, with the participation of delegates from Belgium, Denmark, France, West Germany, Ireland, Italy, Spain, Sweden and Switzerland. Several sugar beet districts in Italy were visited. The conference decided to re-establish the International Confederacy of European Beet-growers which, among other tasks, is to study measures for reducing production costs. It is to co-operate with experimental centres. *G. Agric. Domen.* Vol. 60, Nos. 22, 23, 25, 1950.—E.B.

290 Agrarian Reform. The agrarian reform now taking place in Italy contemplates the immediate redistribution of 1,400,000 ha. This land will be allocated to peasants who will become effective owners in twenty years, during which time reclamation will be carried out. The reform aims at higher production and a reduction in hired labour. For the purpose of the reform the country will be divided into three zones representing different conditions, each requiring different methods. *G. Agric. Domen.* March, 1950.—E.B.

Uganda

291 Cotton Research. A new Cotton Research Station set up by the Empire Cotton Growing Corporation, at Namulonge, 16 miles from Kampala, Uganda, has begun work. It is financed jointly by the Corporation, the governments of Kenya, Nigeria, Nyasaland, the Sudan, Tanganyika and Uganda, and from Colonial Development and Welfare funds. It is estimated that expenditure will average £40,000 a year for the first ten years. A 99-year lease, with right of renewal, has been obtained for 2200 acres. Some of this is papyrus swamp, and a little is too steep to cultivate. The rotation is to be 3-years' cropping and 3-years' grass. A library, laboratories, and sections for plant breeding, genetics, crop husbandry, physiology, soil science, entomology, and pathology have been established. The investigations previously in progress in Trinidad and Barberton [South Africa], and linked with the stations in Swaziland and Natal, are to be concentrated at Namulonge. *New Commonwealth* November, 1950.—N.G.S.

U.S.A.

292 Rice Growing. Aeroplanes are being used increasingly in connexion with rice production in Texas. In the Beaumont area, 20,000 acres of rice were sown, and some 45,000 acres fertilized, from the air. Most of the rice sown was dropped as sprouted rice into flooded fields. This is stated to give better control of barnyard grass. It is customary to fertilize the rice twice in a season, once at seeding, or first watering, and again when the rice is 4-8 weeks old. *Rice Journal* Nov., 1950.—N.G.S.

FIELD CROPS

CEREALS

WHEAT

293 MEIERSON, R. F. [**Placing of winter wheat in herbage rotations in western Siberia and northern Kazakhstan**] [Russian] *Selek. Semenovod* 1950, **8**, No. 6, 85-7. [Barnaul State Pl. Br. Sta.]

On the cereal collective farms and state farms of the steppe and forest zones of western Siberia and northern Kazakhstan the prevailing 10-course rotation is: grass-grass-spring wheat-spring wheat-fallow - spring wheat - oats - fallow - spring wheat,-winter rye-spring wheat and grass. The predominance of spring cereals, particularly spring wheat, can be overcome by substituting winter wheat for spring wheat in some of the courses as shown by the results of experiments conducted by the Siberian Research Institute of Grain Husbandry and other stations. With the maximum introduction into the rotation of winter wheat on stubble, the alternation of crops is: grass-grass-spring wheat-winter wheat on stubble-fallow-spring wheat-winter wheat on stubble. Sowings of winter wheat on stubble should be made in, and not later than, the second half of August. Data obtained by the Siberian Institute of Grain Husbandry and the Barnaul Plant Breeding Station indicate that the application of dung or phosphoric-nitrogenous fertilizers to spring wheat preceding winter wheat has a better effect on the latter crop compared with the direct application to it of mineral fertilizers. The increased yield of winter wheat due to this method of manuring amounts to 6 to 9.5 centners per ha; the yield of spring wheat is also increased compared with that from unmanured sowings.—R.P.J.

294 DI PRIMA, S. Alcune relazioni tra pioggia, temperatura e produzioni in quattro razze di frumento coltivate per un ventennio a Bari. [**Some relations between rainfall, temperature and yield in four wheat varieties grown over a period of twenty years at Bari.**] *Riv. Ecol.* 1950, **1**, 144-92. English summary, p. 184. [Sta. agr. sper., Bari, Italy]

Temperature and rainfall were related to the average yield of grain and straw from four wheat varieties grown over a period of twenty years under identical conditions of manuring and cul-ure. It is concluded that wheat yield at Bari is nfluenced more by temperature than by rain. To tudy the influence of temperature on production it is sufficient to determine the average temperature. It is possible to forecast, with a good approximation, the yield of wheat at Bari by studying the average temperature over certain periods. The general average yield during the 20 years was 15 q./ha. An appendix gives data of rainfall and temperatures during this period.—E.B.

295 PLJUSNIN, A. T., and ŠER, B. L. [**Spring wheat in Kiev province.**] [Russian] *Selek Semenovod.* 1950, **17**, No. 4, 60-3.

In 1949, yields of spring wheat (var. Lutescens 62 and Arnautka Nemerčanskaja), following clover, were 7 to 12 centners per ha. higher than in 1948 when sugar beet was the preceding crop. The hard wheat Arnautka Nemerčanskaja following a clover course gave 3 to 4 centners per ha. more than the soft wheat Lutescens 62.—R.P.J.

296 ČERNYŠ, E. S., and PARAŠTAEVA, O. G. [**Conversion of the Dika variety of spring wheat into winter wheat.**] [Russian] *Selek. Semenovod.*, 1949, **16**, 70-1.

In the first year, seed of the Dika variety is sown very late in the autumn, so that sowing takes place under snow using non-germinated grain. Very few seedlings are obtained in the spring from this sowing. The seeds obtained from these plants are sown again in the autumn but at a time approximating to the normal date of sowing, at the end of October. The stand resulting from this sowing is almost normal in appearance. In the following autumn, seed obtained from the two-year " early winter ' sowing is sown at a date approximating more closely to the normal sowing date. The stand from this sowing is quite normal. Thus in the fourth year the spring variety Dika is sown like the ordinary winter form in September. The winter form of the spring variety Dika is very winter-hardy and tolerates high altitudes. Like spring Dika it is almost completely immune to smut. The winter form gives considerably higher yields than spring Dika (in 1945 the yield was 25 % and in 1946 23.2 % higher.—R.P.J.

297 GOLOVNEV, A. [**Introduction of winter wheat into Siberia. (Some results of the seven-year experiments of stubble sowing in the Siberian steppes.)**] [Russian] *Sovet. Agron.* 1949, **7**, 17-29. [All-Union Sc. Res. Inst. Fert., Agrotech. and Soil Sci.]

The problem of securing good overwintering of wheat in the severe conditions of the open steppe in Siberia is said to have been solved by the adoption of stubble-sowing. Extensive trials of this method have resulted in a technique which guarantees the persistence of winter wheat and which gives high stable yields of 20 to 30 centners per ha. Spring wheat (after a bare fallow) is the best preceding crop in the rotation for stubble-sown winter wheat which should be sown, depending on conditions, at 100, 120 or 140 kg. certified seed per ha. The optimum sowing period is from 20th August to 1st September.—R.P.J.

298 Oliva, A. Granicoltura nei terreni anomali e marginali. [**Wheat cultivation in abnormal and marginal soils.**] *Humus, Milan* 1950, **6**, No. 9, 13-5, bibl. 5.

299 Lagnert, F. Tiderna för sådd, axgång och skörd av höst-och vårvete. [**The dates of sowing, earing and harvesting of winter and summer wheats.**] *Svensk Geogr. Årsb.* 1947, **23**, 21-45, Germany summary pp. 44-5.

The article is based on data furnished by approximately 700 Swedish farmers in response to a questionnaire. The difference in time of sowing between Norrland and Middle Sweden and the comparatively late sowing dates in the South Swedish uplands are noteworthy. Considering the late sowing dates, the dates of harvesting are remarkably early.—R.P.J.

300 Wyoming Agricultural Experiment Station. Bull. 300. **Methods of tillage for winter wheat at Archer Field Station.** By *A. L. Nelson.* 1950, pp. 27.

301 United States Department of Agriculture. Circ. No. 860. **Stubble-mulch farming on wheatlands of the southern High Plains.** By *W. C. Johnson.* 1950, pp. 18.

302 Pini, P. L. La granicoltura nella collina. [**Wheat cultivation on the hills.**] *Humus, Milan* 1950, No. 9, **6**, 16-18.

303 Gasparini, M. Coltura granaria in montagna. [**Mountain wheat cultivation.**] *Humus, Milan* 1950, **6**, No. 9, 9-12.

304 Glasgow, The West of Scotland Agricultural College. Advisory Leafl. No. 8. **Wheat varieties at Auchincruive 1946 to 1949.** By *J. M. Thomson* and *P. J. Jones.* 1950, pp. 3.

305 Woodforde, A. H., and Tilt, J. **Macquarie—a new Tasmanian wheat variety.** *Tasm. J. Agric.* 1950, **21**, 243-5.

A new Tasmanian wheat variety, Macquarie, is described. Its characteristics are discussed and yield data presented. Bred at the Cressy Research Farm in the Midlands of Tasmania, the new variety is a late-maturing selection from the cross Sutton × Braemar Velvet. Its flour is of low strength and low gluten content.—From author's summary.

306 Canada Department of Agriculture and National Research Council. **Report on co-operative tests of wheat varieties, 1950.** [n.d.] pp. 20 [Mimeographed]

Data are given of the yields, time of maturity, lodging-resistance and height of 25 varieties and crosses of wheat tested in 1950 at 23 locations in the prairie provinces. A map of the test locations and soil climatic zones of the region is given and the varieties are ranked according to yield at each location.—P.J.B.

307 Fraser, J. G. C. **Present status of Saunders spring wheat.** *Agric. Inst. Rev.* 1951, **6**, 39-42. [Cer. Div., Expt Farms Service, Ottawa]

A brief review of the present status of Saunders, three years after it was licensed for distribution in 1947, with notes on its performance in Alberta, British Columbia, Manitoba and eastern Canada.—P.J.B.

308 Forlani, R. Le più recenti razze di frumento. [**The most recent wheat varieties.**] *Humus, Milan* 1950, **6**, No. 9, 6-8.

The wheat varieties selected in Italy during the last few years are suitable for the plains and for low hill country. The highest yields in Lombardy are mostly obtained with the variety 0.10. Other high-yielding varieties are Mara, Funo and Fortunato. In a variety trial, which included 0.10, Funo was best with 71.35 q./ha. While 0.10 does well only in particular conditions, S. Pastore is adaptable to different conditions, including cold. Perennial wheat, obtained by crossing *Triticum* with *Agropyron*, is considered of no practical value.—E.B.

309 Maliani, C. Un frumento per l'Italia centrale. Il Comandante Novaro di N. Strampelli. [**Comandante Novaro, a wheat variety selected by N. Strampelli for central Italy.**] *G. Agric. Domen.* 1950, **60**, 286.

This variety is suitable for soils of low fertility. Although intended for central Italy, it is now mainly grown on poor soils in northern Italy.—E.B.

310 Giorgini, G. Nuove razze di frumento. Il Rondine. [**Rondine, a new wheat variety** (in **Italy**).] *G. Agric. Domen.* 1950, **60**, 310.

This wheat variety is early and resistant to rust and lodging, but is affected by late frosts. The area under it is extending in Tuscany, where it is sown about 10th November. In Valdichiana it has yielded 53 q./ha., outyielding the varieties 0.10 and Roma growing under the same conditions.—E.B.

311 DIONIGI, A. Il frumento M5. [**The wheat variety M5.**] *G. Agric. Domen.* 1950, **60**, 237. [Sta. sper. Granicolt. N. Strampelli, Rieti, Italy]

This new variety is described as high-yielding, and resistant to lodging, cold, and *Puccinia graminis*. It is suitable for cultivation over a wide geographical area.—E.B.

312 GOSI, L. Frumenti per la montagna. [**Mountain wheats.**] *G. Agric. Domen.* 1950, **60**, 239.

Brief details are given concerning some of the wheat varieties grown in the Italian mountains.—E.B.

313 FAJERSSON, F. Weibulls Original Pondusvärvete. [**Weibull's original Pondus, a new spring wheat variety.**] Agri. Hort. Genet. 1950, **8**, 119-152, bibl. 7. English summary

Weibulls Pondus was marketed in Sweden in the Spring of 1950. It was derived from a cross between the winter wheat strain W's 4099 and Cahn's 1833, a spring wheat and a sister to Atle. In a series of trials, Pondus has outyielded Diamond II, Fylgia, Progress, Atle, Bronze and Kärn II and the new strain Svalöfs Ella. It is concluded from trials that Pondus does best on soils of high fertility. Its straw strength, as indicated by lodging percentages, is better than that of Diamant II, Fylgia and Kärn II, is approximately the same as that of Ella, and is inferior to Progress; comparisons with Atle and Bronze have given conflicting results. In maturity, Pondus is several days later than Diamond II and Fylgia, about two days later than Bronze and Kärn II, about the same as Ella, and two or three days earlier than Progress and Atle. Pondus, in spite of its low protein content, has baking qualities as high as Bronze; it has a somewhat lower loaf volume than Diamond II and Progress and a considerably lower loaf volume than Atle or Kärn II. Pondus has good disease resistance, though it is slightly more susceptible to *Erysiphe graminis* than Atle, Bronze, or Kärn II. Its grain is yellow and medium large, and very similar to that of winter wheats.—From authors' summary.

314 BAERTUEV, A. A. [**Investigation of early-ripening varieties of spring wheat in East Siberia.**] [Russian] *Selek. Semenovod.* 1949, **16**, No. 12, 44-8, [Bajandaev Prov. Agric. Expt Sta.]

315 SMIRNOVA, A. N., and BOGORDSKIĬ, M. A. [**Quality of Turkmenistan wheats on irrigated and unirrigated soils.**] [Russian] *Selek. Semenovod.* 1949, **16**, No. 12, 49-52. [Baipam.-Aliĭck Expt Sta., Turkmenistan]

The range of variability in the qualitative indexes of the grain of local wheats, depending on conditions of cultivation and variety, is very wide. The absolute weight of grain of six varieties of wheat investigated (Turcikum 57, Meridionale 77, Ak-Bugdaĭ, Kelek M-1, Kizyl-Diža and Komčatka) was higher in crops from irrigated than from unirrigated soil. In the grain from unirrigated soil the content of gluten, total nitrogen and protein is higher than in grain from irrigated soil.—R.P.J.

316 ABKHAZAVA, A. A. [**Sorting of seed increases its yielding capacity.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 6, 56-9. [The Gruzian Republic State Inspection of Seed Quality]

Trials with the Dolis-Puri variety of winter wheat showed that the seeds from the middle part of the ear are superior in absolute weight, germinating power and germinating capacity to seeds from the lower and upper parts of the ear. Seed should be sorted into grades, and the most uniform seed with high absolute weight should be used for sowing on seed plots.—R.P.J.

317 FUCHS, W. H., and BEILER, A. Die Anwendung der biochemischen Methode nach Lakon für die Saatgutprüfung bei heisswassergebeizten Weizen. [**The application of Lakon's biochemical method of seed testing to wheat which has been treated with hot water.**] *Nachrbl. dtsch. PflSchDienst* 1948, **2**, 127-9, bibl. 4.

For the temperatures (about 45°C.) commonly used in hot water treatment of seed, the topographical method of Lakon gives reliable forecasts of seed viability. At temperatures higher than those usually employed there are discrepancies between actual and forecast germination [See *Fld. Crop Abstr.* 3: 609]—D.B.

318 ŠEVČENKO, F. P. [**Increasing spring cereals' resistance to diseases by early winter sowing.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 6, 53-5.

Since 1946, early winter sowing of spring wheat, as recommended by the Siberian Institute of Grain Husbandry for the control of loose smut (*Ustilago tritici*), has been carried out at the Barnaul Phytopathological Department of the State Commission for Varietal Trials. The results indicate that early winter sowing not only improves the sanitary condition of the seed material, but it also enhances valuable properties of the varieties, including disease resistance, when the seeds (from the early winter sowings) are used subsequently in spring sowings. This practice is of special importance under Siberian conditions.—R.P.J.

319 Hanson, E. W., and others. **The relation of the bluegrass billbug, *Calendra parvula* Gyllenhal), to the development of basal stem rot and root rot of cereals and grasses in north-central United States.** *Phytopathology* 1950, **40**, 527-43, bibl. 6. [Minnesota Agric. Expt Sta., St. Paul]

Calendra parvula is found widely distributed in north central U.S.A. It attacks the lower internodes of the stems and the roots of many cereals, providing a point of ingress for root and basal stem rots. Spring and winter wheat, rye and barley are commonly attacked, oats only occasionally. Such short-lived hosts as the cereals can usually mature seed before being killed by the rots accompanying infestation ; the earlier the infestation, the greater being the resultant damage to the plants. The symptoms of billbug infestation are described and illustrated. Tabulated data are given of the percentage of billbug infestation in several varieties of wheat. Among the cereals, *durum* wheats were the most susceptible, followed by the hard red spring and hard red winter wheats. Preliminary trials with *Triticum timopheevi* Zhuk. showed a very low incidence of infestation in this variety. Of 150 *durum* and hard red winter wheats tested, none had a high degree of billbug resistance. The control of billbug is discussed. Among measures advocated are sound cultural practice and the inclusion in rotations of apparently immune crops such as alfalfa, red, white, alsike, ladino and sweet clover, soyabeans, flax and potatoes. A non-susceptible crop should first be grown on newly-ploughed grassland. Experiments on the control of billbug by varying the time of seeding of spring wheats gave no conclusive results.—P.J.B.

320 Pugsley, A. T. **The resistance of oro and orfed wheats to *Tilletia caries* and *Tilletia foetida*.** *Aust. J. agric. Res.* 1950, **1**, 391-400, bibl. 9. [Waite Agric. Res. Inst., Univ. Adelaide]

321 Polsakov, I. M. [**A chemical method of combating loose smut *(Ustilago tritici)* of wheat by means of Rodan.**] [Russian]. *Doklady Vsesojuz. Akad. S.-H. Nauk.* 1950, **15**, 27-34.

Rodan, a new preparation, is highly effective in destroying fungus mycelium within seeds, and has no harmful effect on germination of the grain, or on the plant. In contrast to other chemical compounds, it readily penetrates the seed coat. Treatment with Rodan is in many respects as effective as the heat method of disinfection, and in some particulars is even superior to it.—R.P.J.

322 Gough, H. C., and Dunnett, F. W. **Rabbit damage to winter corn.** *J. Minist. Agric.* 1950, **57**, 374-78, bibl. 2. illus.

323 Lona, F. Primo saggio di esperienze sull'ecologia dello sviluppo. Ciclo di sviluppo generativo e ciclo vegetativo in rapporto alle variazioni altimetriche. [**First essay on trials on the ecology of development. Generative development cycle and vegetative cycle in relation to variation of altitude.**] *Nuovo G. bot. ital.* 1949, **56**, 516-34, bibl. 19. English summary, p. 533. [Ist. bot. Univ. Milano]

A first account is given of a preliminary series of trials which have been started at (1) Viotte in the Orto Sperimentale Alpino (Monte Bondone, Trentino) at 1600 m.a.s.l. (2) in the vicinity of Trento at 160 m.a.s.l. and (3) at Milan at about sea-level, to study the changes in the plant cycle in relation to altitude, vernalization and thermoperiodism. The behaviour of various species and varieties of plants was examined and the results are summarized as follows : (a) the autumn wheat varieties Tevere and Rieti, sown in May at Viotte gave flowers and seeds — thus behaving as spring wheats but when sown at the same time at Trento they were still in the tillering stage in the late autumn ; (b) an autumn-spring oat variety flowered earlier at Viotte than at Trento, (c) the flowering of spring cereals was delayed at Viotte, (d) the phases of anthesis and seed formation were longer at Viotte than at Trento, (e) *Brassica rapa* var. Milan, a biennial in the plain, flowered in the first year at Viotte, (f) other biennials tried did not behave like *B. rapa*, (g) annual plants such as flax, hemp, etc. had a longer development cycle at Viotte than in the plain, (h) caryopses produced by autumn wheat plants grown at Viotte were shown to have been vernalized as they gave plants which behaved as spring wheats when grown at Milan. Some plants have a shorter development cycle in the Alps than in the plains, e.g., as (a) above, and it is suggested that this is due to the vernalization of the seed caused by low night temperatures. Where some plant species show a longer development cycle it is supposed that this may be due to high day temperatures causing devernalization.—E.B.

324 Coïc, Y. Contribution à l'étude de la physiologie du blé : la nutrition azotée du blé. [**A contribution to the study of the physiology of wheat : the nitrogen nutrition of wheat.**] *Ann. Inst. nat. Rech. agron.* Ser. A. 1950, **1**, 195-203. [Quimper]

Wheat requires nitrogen fertilizer at tillering and continuously afterwards in amounts which depend on variety of wheat, climate, soil, and previous manuring particularly before tillering. Nitrogen fertilizer added during the flowering season has but a feeble action on existing shoots and sometimes results in the late development of adventitious shoots, some of which may produce fertile ears with slow-maturing grain. Nevertheless, nitrogen fertilizer applied during flowering gives a net increase in yield of grain and also in the proportion of dry matter in the grain to dry matter in the straw. It is thought that the effects of nitrogen fertilization are twofold, resulting in an increase in the amount of assimilatory material, especially if nitrogen is given early enough, and an increase in photosynthetic activity.—D.B.

325 GARDNER, H. W. **The effect of nitrogen top dressings on the yield and protein content of winter wheat.** *J. Minist Agric.*. 1950, **57**, 1-8.

The results are reported of winter wheat variety trials in Hertfordshire during 1943-48 on the main soil types of the county and on soils varying widely in fertility. In trials at 32 localities during 1944 to 1947, with 9 varieties, Scandia gave the highest yield, with 23.04 cwt. per ac., followed by Juliana 21.17, Weibull's Standard 21.16, Desprez 80, 20.87 and Steadfast 20.63 cwt. per ac. In tests since 1947, Bersée gave slightly higher yields than Scandia and did well over a wide range of soil and fertility conditions. In trials at 19 localities over the same period of time, 1.5 cwt. of sulphate of ammonia per ac. was applied as a top-dressing on about the 12th May to half of each of the variety strips used in the previous test. The average yield increase over the untreated plots was 3.66 cwt. of grain. The 9 locations of highest fertility had an average yield increase following the nitrogen application of 4.17 cwt. per ac., whilst the 9 locations of lowest fertility had an average yield increase of 3.15 cwt. per ac. (all grain yields corrected to 13 % moisture content.) The nitrogen response differences between varieties was greatest between Scandia and Juliana, with yield responses of 4.16 and 2.91 cwt. per ac., respectively. The yield response of Little Joss was a close second to that of Scandia, with 4.14 cwt. per ac. The average protein content of 8 varieties over the years 1946 to 1948 was headed by Holdfast, with 10.45 %, followed by Little Joss, 10.42 % and Bersée, 10.03 %. Scandia was last, with 9.59 %. There appeared to be no connection between the level of soil fertility and the protein content of the varieties, but seasonal climatic variations had a considerable effect on the protein content ; in 1946, a very wet year, the protein content of Holdfast was 9.72 %, compared to 10.85 % in 1948, a very good year for wheat. The average increase in the protein content of varieties following top-dressing for the 8 varieties over the same period of time was 0.36 %, though there was considerable variation between localities. The average nitrogen recovery for top-dressing was 26.1 % for all varieties; Holdfast gave the greatest nitrogen recovery, with 31.9 %, followed by Bersée, 31.8 %; Juliana was last, with 15.8 %.—P.J.B.

326 BURVILL, G. H. **The salt problem in the wheat belt [Western Australia].** *J. Dep. Agric. W. Aust.* 1950, **27**. 174-80.

The three types of salt land in the wheat belt include : (1) The places where springs and seepages develop along the sides of gullies or higher up the slopes. Here a tight subsoil layer brings moving underground water close to the surface where it evaporates leaving a salty crust. These places are wet all the year round; (2) Places where salt water is found about 3 to 6 ft. from the surface of fairly extensive flats, and bare salt patches are common. These remain damp in summer but often have a loose puffy surface. (3) Bare salt patches which are found at high or low level on some of the heavier types of soil—usually in lower rainfall country. The best way of controlling these salt patches is by growing salt-tolerant plants which use up the moisture and so prevent the salt from coming to the surface in the moisture. For (1) the grasses *Paspalum vaginatum* and *Sporobolus virginicus* are recommended for planting. For controlling (2) and (3) every effort should be made to encourage growth on the land by cultivation, seeding and fertilizing, but the land should not be fallowed while there are living plants on it. Early-maturing cereals such as Bungulla wheat, Wongan oats, and Greenough barley along with Wimmera rye-grass could improve the plant cover and grazing. Other salt-tolerant plants, are not easily available for large-scale planting. They include trailing saltbush (*Atriplex semibaccata*), old-man saltbush (*Atriplex nummularium*), beetroot, silver beet, mangolds, and curly ryegrass (*Pholiuris incurvis*).—K.O.

327 BELL, G. D. H. **Some British plant breeding problems.** *Agric. Progr.* 1950, **25**, 15-24. [Plant Breed. Inst., Cambridge]

The crops discussed include wheat, barley, oats, sugar beet and field legumes.—K.O.

BUCKWHEAT

328 KROTOV, A. S. [**Obtaining hybrid seeds of buckwheat *(Fagopyrum esculentum)* in varietal mixtures.**] [Russian] *Selek. Semenovod* 1950, **17**, 1-5. [All-Union Inst. Crop Husbandry]

Work initiated in 1945 indicated that the sowing of a mixture of varieties makes it possible to obtain hybrids which give a yield 30 to 40 % higher than that obtained from ordinary varieties.—R.P.J.

329 KOPELJKIEVSKIĬ, G. V. [**New varieties of buckwheat of the Šatilov State Plant Breeding Station.**] [Russian] *Selek. Semenovod.* 1949, No. 8, pp. 30-3.

Recently bred varietites of *Fagopyrum esculentum* which are of particular interest are Orlovskaja-2 and Skorospelaja-3: the latter is recommended for stubble sowings and for sowing after fallow. Orlovskaja-2 has large grain, the hull percentage is 23, protein content 13.5 and fat content 2.6 %. The variety has a well developed stem with a large number of branches of the first, second and third order, forms supplementary inflorescences, flowers and seeds, possesses straw resistant to lodging, and is therefore well adapted for cultivation on collective farms where the ley system of farming is practised. Orlovskaja-2 proved superior in yield to the regional varieties Bogatyrj and Kazanskaja in 1947 to 1948 in the black earth zone of the Orlov province. Its average yield in 1948 exceeded the yields of the other varieties by 2.4 centners per ha., and on individual varietal plots the increased yield amounted to 8.3 centners per ha. Skorospelaja-3 shows to less advantage if its yielding capacity is compared with that of Bogatyrj, but compared with the variety Kazanskaja, which approximimates more closely to it in period of ripening, preference should be given to Skorospelaja-3 in the provinces of Brjansk, Sumy and others with similar natural conditions. Date of sowing trials indicate that the most suitable time for sowing Orlovskaja-2 is at the end of the second and beginning of the third decade of May, and for Skorospelaja-3 at the beginning of June.—R.P.J.

330 RUSINOVA, I. P. [**Methods of effective application of fertilizers to buckwheat on podzols.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1950, **15**, No. 4. 23-8.

The successful cultivation of buckwheat in the northern regions of the non-black soil zone is possible, but the use of fertilizers, in accordance with the nutritive requirements of the plant, and the correct distribution of the plants in the plot are of primary importance for obtaining high and stable yields. The most effective method of applying mineral fertilizers is to combine the basic dose of complete fertilizer before sowing, with a small dose of N fertilizer (15 kg. per ha. N.) when the buckwheat is in the budding stage. The best method of sowing is in drills 30 cm. apart using a seeding rate of 50 kg. per ha.—R.P.J.

OAT

331 GLASGOW. The West of Scotland Agricultural College. Advisory Leafl. No. 7. **Oat varieties at Auchincruive, 1938 to 1949.** By *P. J. Jones*. 1950, pp. 4.

332 SWEDEN Lantbrukshögskolan Jordbruksförsöksanstalten Medd. 28. Blandsäd av havre och ärt. Resultat av försök med ärtblandsäd, utförda under åren 1936-1943. [**Mixed crops of oats and peas. Results of experiments with mixed crops of oats and peas carried out by the Agronomy Experiment Station of Sweden during the years 1936-1943.**] By *Ivar Bacher*. English summary pp. 76-7. 1949, pp. 80.

333 TIDSSKRIFT FOR PLANTEAVL. Forsøg med havresorter 1945-1948. [**Trials with oat varieties 1945-1948 (in Denmark).**] *Tidsskr. Planteavl* 1950, **53**, 725-7.

Known and new oat varieties were included in the trials at the State experiment stations, the trials on arable land being conducted on clay humus soil at Aakirkeby, Lyngby, Tystofte, Abed, Blangstedgaard and Askov, and also on sandy humus at Jyndevad, Lundgaard, Studsgaard, Borris and Tylstrups. Trials were also carried out on marsh at Hojer, and on low moor and high moor at Tylstrup The grain yield was comparatively high, on the average 43.9 hkg. per ha. on clay humus and 33.2 hkg on sandy humus. The trials comprised 9 varieties, 3 of which—Pajbjerg Rex, Borris Opus, and Borris Opus II—were included in all the trials. —R.P.J.

334 OPSAHL, B. Forsøk med havresortar. [**Variety trials with oats.**] *Forskn. og forsøk landbr.* 1950, **1**, 3-34.

During the period 1928-48 several oat varieties were compared in ninety-eight field experiments on the Experimental Farm at Forus, and on a number of other farms in western Norway. Yield, earliness of ripening, stiffness of straw and quality of grain were investigated. Svaløf's Orn (Eagle) has given significantly higher yields of grain than most of the other varieties: it has extremely strong straw. Its grain is yellowish-white, somewhat small with a low percentage of hull and medium hectolitre weight. It is rather late in ripening. Gullregn II (Golden Rain II) ranks among the highest-yielding varieties in these trials. Its grain is yellow, of medium size with low percentage of hull and high hectolitre weight. It ripens about 3 days earlier than Orn. Jøtul, selected at Forus from a cross between Sølvhavre II (Silver Oat II) × a pure line of a local strain of grey oats, is especially adapted for use as green fodder owing to its large leaf production. It also gives heavy crops of grain, the quality of which is, however, below medium, due to low hectolitre weight. *Merkur*, selected at Forus from a cross between Sølvhavre I (Silver Oat) × a local strain of grey oats, ripens about 8 days earlier than Gullregn II. It has rather weak straw and has unsatisfactory grain quality, because hectolitre weight is too low and percentage of hull too high. *Rygja* is a new variety selected at Forus from a cross between Sølvhavre II (Silver Oat II) × Fransk svarthavre (French Black-hulled). It has outyielded all other varieties and has also resisted lodging better. It ripens at about the same time as Gullregn II and has fine quality grain, but its percentage of hull is rather high.—R.P.J.

335 KOEHLER, B., and BEVER, W. M. **Oat and wheat seed treatments in 1950, in relation to dosage, storage before planting and thoroughness of mixing.** *Plant Dis. Rep.* 1950, **34**, 259-61. [Illinois Univ., Urbana]

In trials with smutted oat seed, NI Ceresan and Ceresan M gave complete smut control when used at rates of 0.25 oz. per bu. of seed, followed by storage of the treated seed in stoppered bottles for one week prior to sowing. Oat plants grown from seed treated with 0.25 oz. per bu. of NI Ceresan and then stored for one month prior to sowing, showed distanct lack of vigour as compared with plants from seed treated with 0.25 and 0.375 oz. per bu. of this fungicide and shared for a similar time. Under similar seed storage conditions, the growth-retarding effect of Ceresan M used at a rate of 0.5 oz. per bu. of seed was much less than that of NI Ceresan : whilst plants grown from seed treated with Panogen, at rates of 0.5 and 0.75 oz. per bu., showed no subsequent loss of vigour. At all the rates of application quoted above, smut control was complete. Trials were also carried out to determine the effect of treatment with normal and excess amounts of NI Ceresan, Ceresan, M. and Panogen, on the emergence of smutted wheat seed. The results quoted are for the variety Pawnee. In all cases, except that of the check, the treated seed was stored for three months in stoppered bottles prior to sowing. The check consisted of similarly treated seed stored for one day prior to sowing. The seedling emergence of the wheat seed treated with a normal application of 0.5 oz NI Ceresan, per bu., and excess amounts of 1.0 and 2.0 oz. per bu. was 78.3, 53.3 and 40.6 %, respectively, compared with 86.0 % for the control. The seedling emergence of seed treated with similar amounts of Ceresan M was 82.7, 63.3 and 46.0 % respectively, compared with 90.3 % for the control. Panogen gave the best results in terms of seedling emergence, the emergence from seed treated with a normal application of 0.75 oz. per bu. of Panogen and excess amounts of 1.5 and 3.0 oz. per bu. being 87.7, 83.0 and 50.7% respectively, compared with 84.7% for the control. —P.J.B.

336 LEUKEL, R. W. **Seed treatment tests on oats and barley in 1950.** *Plant Dis. Rep.* 1950, **34**, 314-5.

Nine fungicidal materials were tested as seed treatments for the control of oat smut (*Ustilago* spp.) and barley stripe (*Helminthosporium gramineum*). Ceresan NI and Ceresan M, both at rates of 0.5 oz, Aagrano 48 at 1.0 and 2.0 oz., Aagrano 250 at 0.5, 1.0 and 1.5 oz., and Panogen at 1.0 and 1.25 oz., per bu. of seed, were equally effective in controlling oat smut. Ceresan NI and Ceresan M. dusts, both at 0.5 oz, Aagrano 48 at 1.5 oz, Aagrano 250 at 0.75 oz., and Panogen at 1.0 and 1.25 oz. per bu. of seed all gave complete control of *H. gramineum* in barley seed. Oat and barley seed treated with the above fungicides and at the rates given was stored for one and for six months at room temperatures prior to sowing, but in no case was its emergence or germination significantly affected.—P.J.B.

337 MELDRUM, H. R., and others. **Liming and fertility investigations on the slowly-drained prairie soils of north-eastern Iowa.** *Iowa State Coll. Agric. Expt Sta.* Report on Agric. Res. for year ending June 30, 1949, 115-9.

Data are given of the effect of different amounts of P_2O_5 and K_2O fertilizer at rates of 30 and 60 lb. per acre, alone and in all possible combinations, on the yield of oats in maize-oats-clover rotations on Carrington and Clyde silt-loams. K_2O had no significant effect on yields. 30 lb. P_2O_5 per acre gave significant yield increases over controls on Carrington silt loam, but not on Clyde silt loam. 60 lb. P_2O_5 per acre did not give significantly higher yields than 30 lb. P_2O_5 per acre. In trials with maize, increasing the number of stalks per hill from 2 to 4 raised yields 11.1 bu. per acre at low fertility levels [50 lb. per acre 0-20-20 NPK in hill] and 16.4 bu. per acre at high fertility levels (250 lb. per acre 10-20-20, plus 5 tons manure ploughed in and 50 lb. per acre 10-20-20 NPK in hill). In trials in which 8 different fertilizer and manurial treatments were compared on 3-year rotations of maize-oats-hay, 6 tons manure per acre gave greater yield increases of maize and oats than any other treatments. As compared with controls, the average yield increases of maize following applications of 100 lb. of 0-20-0 NPK per acre were 2.6 bu. per acre ; for 100 lb. 0-0-20 NPK per acre, 1.2 bu. per acre, but for 100 lb. 0-20-20 NPK, increases were 7.2 bu. per acre. Where 2 tons of manure per acre were applied, 100 lb. per acre of 0-20-0 NPK gave no significant increases in yields. Applications of 200 lb. of 0-20-0 NPK per acre to oats, rasied yields by 10.6 bu. per acre, but 200 lb. of 0-0-20 NPK per acre resulted in consistent yield decreases averaging 6.7 bu. per acre.—P.J.B.

338 SVERKUNOV, V. K. [**Degeneration of cultivated oat into wild oat.**] *Agriobiologija* 1950, No. 1, pp. 128-30 [Irkutsk Agric. Inst., Dept. Plant Ind.]

On examining more than 5,000 panicles of the naked oat No. 139/H7 variety Hinensis, upwards of twenty panicles containing some grains of wild oat were discovered. The wild oat grains occurred in different parts of the panicle, lower, middle and upper ; while in individual spikelets all the grains were of the wild oat type. Grains of the wild oat type were sown in boxes in the laboratory, and twenty-seven ripe spikelets were harvested and examined: in twenty spikelets grains of wild oat type had developed; in three, naked grains; and in four, grains of intermediate type. In the mixed panicles, side by side with typical wild oat grains, naked grains were formed but of an intermediate type having the characters both of the wild oat ("horse shoe") and of the naked oat. Thus it appears that degeneration of *Avena sativa* into *Avena fatua* is an indisputable fact.—R.P.J.

339 HEATHCOTE, J. G. **The protein quality of oats.** *Brit. J. Nutrit.* 1950, **4**, 145-54, bibl. 28. [Cereal Res. Sta., Res. Ass. Brit. Flour Millers, St. Albans]

RYE

340 TIDSSKRIFT FOR PLANTEAVL. Foreløbig meddelelse om forsøg med rugsorter 1946-1948. [**Preliminary report on 1946-1948 trials with rye varieties (in Denmark).**] *Tidsskr. Planteavl* 1950, **53**, 723-4.

The trials were carried out on well-manured land, under good cultivation conditions, on clayey humus soil at Lyngby, Aarslev and Askov; on good sandy humus at Borris and Tylstrup; on light sandy soil at Jyndevad, Askov and Studsgaard; and on high moor at Tylstrup. The trials comprised 7 varieties (on high moor only 5): Borris Perle, Haastrup, Maria, short-strawed Petkus, Trifolium, Svaløf Stål and Svalåf Kongs-rug. The trials on arable land are divided into two yield groups; the first comprising Lyngby, Aarslev, Askov, Borris and Tylstrup, where all had an average grain yield of approximately 40 hkg. per ha; and the second Jyndevad, and Studsgaard with a grain yield of approximately 25 hkg. per ha. —R.P.J.

341 MUNTZING, A. **Cyto-genetic properties and practical value of tetraploid rye.** *Hereditas*, 1951, **37**, 17-84, bibl. 31. [Genetics Inst., Lund Univ., Sweden]

The agronomic characters of a number of tetraploid rye varieties, including Steel-rye, Wasa II, Sangaste, Toiro, Kings rye and a number of intercrosses were studied. The average plant height was about 15 % greater in the tetraploids than normal diploid ryes; there were no differences between the straw stiffness of the two. The kernel weight of the tetraploids averaged 50 % more than that of the diploids, though the effect of this factor on yields was offset to some extent by the 20 to 25 % lower seed set of the tetraploid ryes. There was a marked incompatability between the tetraploid and diploid ryes and the seed set of tetraploid rye was much reduced by exposure to diploid pollen. Tests with Steel rye showed that it had a higher content of protein and gave a 10 % greater bread volume than diploid Steel rye. In 8 years yield trials at 6 locations in south and central Sweden, Steel rye gave the highest yield of the number of tetraploid ryes tested, though data from 18 trials failed to show any significant differences between the yield of tetraploid and diploid Steel rye. Steel rye is now being multiplied in Sweden and will be released to farmers in the autumn of 1951 or 1942. From author's summary.

342 GARCÍA, Nora W. de S. and others. El centeno en la Argentina. [**Rye in Argentina.**] *Bol. Prod. Fom. Agric.* 1950, **2**, 2-34. maps 9.

BARLEY

343 TIDSSKRIFT FOR PLANTEAVL. Forsøg med bygsorter 1943-1948. [**Trials with barley varieties 1943-1948 (in Denmark).**] *Tidsskr. Planteavl* 1950, **53**, 719-21.

In 1947-48 the State Experiment Stations at Aakirkeby, Lyngby, Tystofte, Abed, Blangstedgaard, Højer, Askov, Borris and Tylstrup continued the trials with barley varieties which were reported in Meddelelse No. 397. Among the older varieties, which were included in 6 trials, Abed Maja barley gave the highest yield with 44.7 hkg. grain per ha. and Svalöf Freja barley the lowest with 44.0 hkg. per ha. Svalöf Ymer, in trials over 4 years, gave 0.7 hkg. more per ha. than Maja, while Lenta gave 0.3 hkg. less than Ymer. Carlsberg gave 0.9, and Pajbjerg Drot 0.6 hkg. more grain per ha. than Maja, but these varieties were only tested in trials over 2 years. In straw yield, Alfa differed from the other varieties in giving a large return; Freja and Ymer gave small straw yields. Alfa has the weakest straw: Rigel, Freja and Ymer have stiff straw. Rigel has the highest and Alfa the lowest hectolitre weight. Freja ripens two or three days earlier, and Alfa about 3 days later, than the other varieties.—R.P.J.

344 HÖRBERG, Y. Weibulls original rikakorn. [**Weibull's original Rika barley.**] *Weibulls Årsbok* 1950, 7-8.

Rika, a sister variety of Herta barley, is to be placed on the market in the spring of 1951. In the majority of trials in Sweden, Rika surpassed Herta in yield, and the same result was obtained in trials in Holland and Denmark. The grain of Rika is as plump, smooth and fine as that of Herta. Germination ripeness is as late as in Herta so that the risk of sprouting in the field is slight.—R.P.J.

345 STARKOV, A. A. [**Biological means of control of loose smut.**] [Russian] *Selek. Semenovod.*, 1949, **16**, No. 8, 69-70. [Rostov Provincial Inspection, Grain and Oil Crops]

The method of control by means of early winter sowing of infected grain of spring cereals is based on the effect of low temperatures on the developing mycelium of loose smut in the germinating seeds. This method has been successfully used with spring barley in the Rostov province. Infected seed (16.3 % infection) sown at the beginning of December, on an area of 10 ha. at the rate of 120 kg. per ha. yielded 140 centners of seed which on inspection, was found to be almost completely free from loose smut (0.001 % infection).—R.P.J.

346 KUPERMAN, F. M. [**Development of many-flowered spikelets in barley.**] [Russian]. *Doklady Vsesojuz. Acad. S-H. Nauk.* 1950, **15**, 13-15.

Ears of two-rowed and many-rowed barley, and those of rye and wheat, may, under certain conditions of growth, develop two-flowered and multi-flowered spikelets as well as single-flowered spikelets.—R.P.J.

347 SMIRESNKIĬ, N. V. [**Improvement of the quality of barley.**] [Russian] *Selek Semenovod.* 1949, **16**, 58-60.

The results of trials conducted in 1946 in the Zvenugorod district, in the province of Moscow indicated that on podzols the application of nitrogen at the rate (per ha.) of 40 kg., of phosphorus at 90 kg. and potassium at 60 kg. is to be recommended. Different sowing dates were investigated : 6th May (early), 16th May (medium) and 26th May (late). The barley was harvested during the period of full ripeness, the early on 10th August, medium on 23rd August and late on 29th August. Data relating to chemical changes which occur in the grain indicate that harvesting of barley should be carried out at the beginning of full ripeness and should be completed as soon as possible.—R.P.J.

MAIZE

348 ANGLADETTE, A. Le maïs dans les territoires de la France d'outre-mer. Situation actuelle et avenir de la production. [**Maize in the overseas territories of France. The present situation and future of production.**] *Agron. trop.* 1950, **5**, 406-11.

349 SWANSON, C. L. W., and JACOBSON, H. G. M **Soil factors affecting corn growth using herbicides and cultivation for the control of weeds.** pp. 8. [Mimeographed] [Connecticut Agri. Expt Sta., New Haven]

A study of the effect of the physical condition of soils, as modified by cultivation, on the yield of maize.—P.J.B.

350 SCOSSIROLI, R. Contributo alla conoscenza del mais (*Zea mays*). Descrizione agronomica. [**A contribution to the knowledge of maize (*Zea mays*). Agronomic description.**] Suppl. to *Ann. Sper. agr.* 1951, **5**, 23-41, bibl. 7. English summary, p. 41. [Sta. sper. Maiscolt., Bergamo, Italy]

The characters of maize to be taken into consideration for a taxonomic description of the Italian varieties were examined in a previous article (see *Fld Crop Abstr.* 3, Abs. 1554]. In the present article characters to be considered in describing maize varieties, from the point of view of their practical importance, are examined. Characters such as thickness of stem, the colour and chemical composition of the grain are of no value for a taxonomic description, although they have practical importance. The design is given of a card employed in the agronomic description of maize varieties. This card records information on : locality, soil, root, stem, leaf, male and female inflorescences, caryopsis, yield, chemical composition, resistance to various adverse factors, etc.—E.B.

351 DE ROSA, M. I granoturchi ibridi nelle terre dell'Irpinia. [**Hybrid maize in the Irpinia, Campania (Italy).**] *G. Agric. Domen.* 1950, **60**, 333.

[See *Fld. Crop Abstr.* 3, Abs. 422.] The second year's trials with various north American hybrid maize varieties grown in Campania have confirmed that hybrid maize is generally higher yielding, and has greater drought-resistance, than the local varieties. On the other hand, the hybrid varieties proved unsuccessful on sandy soils and, in some cases, were too late in this environment.—EB.

352 GOSI, L. Prato-mais. [**Maize after a temporary ley.**] *G. Agric. Domen.* 1951, **61**, 35.

See *Fld. Crop Abstr.* 2, Abs. 813. By employing suitable varieties, it is possible in Italy to obtain in one year, from the same land, 50 to 70 q./ha of hay by cutting lucerne, red clover or white clover in a temporary ley once or twice during spring, and about 60 q./ha of maize grain from a crop sown between the middle and the end of May, after the ley has been ploughed in. The maize varieties employed must be both early and high yielding. Besides a few local maize varieties, some American hybrids have these requisites, namely, Wisconsin 464, Kingcrost KO, Maygold 49, Fund G. 19, Iowa 4316, U. 32, Funk G. 114, etc.—E.B.

353 OKLAHOMA Agricultural Experiment Station. Misc. Publ. MP-18. **Performance tests of corn varieties and hybrids 1950.** By *J. S. Brooks* and *H. Pass.* 1950, pp. 40.

354 PURDUE UNIVERSITY Agricultural Experiment Station. Sta. Circ. 340. **Performance of open-pedigree corn hybrids in Indiana.** By *S. R. Miles* and *J. E. Newman.* 1950, pp. 8.

355 VILLAMIL, F. Control de malezas en el maiz con 2,4-D. [**Weed control in maize with 2,4-D. (in Colombia).**] Notas Agronomicas Palmira 1950, **3**, 143-4, bibl. 3. illus. English summary, p. 144.

Applications of 1.5 and 2.5 lb. of 2,4-D sodium salt in 180 gal. water per acre, when the maize was between 12 and 15 cm. high, inhibited germination of *Convolvulus* sp., *Amarantus spinosus*, coltsweed [sp. not known] and rabbit weed (*Paspalum* sp.). —N.G.S.

356 LOUSTALOT, A. J., and FERRER, R. **Studies on the persistence and movement of sodium trichloreacetate in the soil.** *Agron. J.* 1950, **42**, 323-7, bibl. 5. [Fed. Expt Sta., Mayaguez, P.R.]

In greenhouse experiments, as in field experiments, TCA was more toxic to *Zea mays* than to *Cajanus indicus*. Toxicity to these plants decreased with the passage of time; the rate and degree of this decrease was greatest at high temperatures and, in soil stored at 45°C. toxicity entirely disappeared within 2 weeks. The toxicity of TCA in air-dry soil appeared to increase with the passage of time and persisted longer in soil with a medium moisture level than in saturated soil. At all rates of application, TCA toxicity disappeared inside 1 month in saturated soil, within 2 months in soil with a medium moisture content, and after a longer period in clay soil. In field trials, plots treated with only 30 lb. TCA per acre were practically free of perennial grasses and *Cyperus rotundus* 4 months after treatment.—From authors' summary.

357 BERGAMO, Stazione Sperimentale di Maiscoltura. Publ. No. 55. Per la conoscenza del nanismo del mais. [**Dwarfing of maize.**] By *R. Scossiroli*, 1950, pp. 21, bibl. 19. English summary, p. 20.

In a great part of northern Italy during 1949, maize crops presented a form of dwarfing which is believed to have been caused by a virus not yet identified. The degree of dwarfing was variable. In the most serious cases, both male and female inflorescences were sterile; in other cases the male inflorescence only. Trials with various dent and two flint varieties were carried out in two different localities and the results analysed statistically to determine the reduction in yield caused by dwarfing. The percentage of plants affected in the dent varieties was higher than in the flint varieties. It is thought that strains resistant to dwarfing could be selected from these two flint varieties.—E.B.

358 VIALE, E., and ROSADO, E. H. Chinche de la raíz del maíz (*Cyrtomenus* sp.) [**Maize root bug, *Cyrtomenus* sp.**] *Turrialba* 1950, **1**, 93-4, illus.

At the Inter-American Institute of Agricultural Sciences, Turrialba, maize root bug (*Cyrtomenus* sp., probably *C. ciliatus*) was controlled by 0.1 to 0.15 % Aldrin applied at a rate of 1.5 to 2 lb. of the active principle, or its equivalent per ha. Parathion, although superior to Aldrin, Clordane and Dieldrin in laboratory tests, gave a very reduced degree of control in the field.—N.G.S.

359 VIALE, E., and ROSADO, E. H. **Control of cornroot chrysomelids.** *Turrialba* 1950, **1**, 91-2, illus. [Dept. Plant Indust. I-A.I.A.S. Turrialba, Costa Rica]

The new chlorinated insecticide Aldrin, applied directly on planted maize rows when the young plants were either 15 or 20 days old or at the pre-emergence stage, gave complete control of the cornrootworm (*Diabrotica* spp.) at Turrialba. A single application of 0.15 % Aldrin wettable powder was economically effective. It is suggested that this be applied at a rate of 1.5 lb. actual insecticide per 10,000 hills of maize.—N.G.S.

360 NEBRASKA Agricultural Experiment Station. Res. Bull. 161. **The structure and reproduction of corn.** By *T. A. Kiesselbach.* 1949, p. 96. bibl. 102. [Received 1951]

This bulletin summarizes the results of investigations into the structure and reproduction of the maize plant (*Zea mays*). Stress is laid on floral development, fertilization and embryology. The botanical relationships, origin, genetics and breeding of maize are briefly reviewed.—P.J.B.

361 SHAW, R. H., and LOOMIS, W. E. **Bases for the prediction of corn yields.** *Plant Physiol.* 1950, **25**, 225-44, bibl. 19. [Iowa State College, Ames]

An attempt has been made to determine the pre-harvest measurements most likely to be of value in predicting yields of *Zea mays*. The development of the plant can be divided into distinct stages, each with its own responses to weather and its own relation to final yield. The first two stages involve vegetative measurements and indicate the potentialities of the plant. They are (1) germination to the first 3 or 4 weeks of independent growth when all tissues are laid down, and (2) the period of rapid vegetative growth with great increase of leaf area and stalk length. A further stage, ear growth and development, indicates yield itself. The stages of ear measurement are: (a) ear shoot development, pollen formation and fertilization, (b) ear growth, (c) translocation and filling of the kernels to maximum size and (d) the drying to harvest maturity. Tables give correlations of yield with the various vegetative and ear measurements. With the former they were from + 0.79 and + 0.76, with the latter they were between + 0.90 and + 0.98.—D.B.

MILLET AND SORGHUM

362 MARCHAL, A. Les pénicillaires cultivés au Niger. [**The *Pennisetum* spp. grown in the Niger region (French West Africa).**] *Agron. trop.* 1950, **5**, 582-92.

Information is given on the area of cultivation in the Niger region, the culture methods, and the botany of millet (*Pennisetum* spp.), a staple native food crop. North of the River Niger it is grown up to the limit of the non-irrigated farming area. In the Sahel region *Pennisetum* cultivation exceeds that of *Sorghum* in the areas having a yearly rainfall under 700 mm., and tends to replace it in areas where the rainfall is under 400 mm. The water requirement of *Pennisetum* varies greatly with different types. The more exacting ones require from 400 to 800 mm. of rain distributed over three and a half months, while 220 mm., if well distributed in July/August, are sufficient for other types. The yield, which is greatly influenced by rainfall, can reach 12 q./ha. with the long spiked types. In the drier regions of the Niger there is a wild species of *Pennisetum* (*P. mollissimum*) akin to the cultivated species. The present botanical classification of the cultivated *Pennisetum* species is considered unsatisfactory, and a practical classification based on the spike characters is proposed.—E.B.

363 LEUKEL, R. W., and MARTIN, J. H. **Loose kernel smut of Johnson grass.** *Phytopathology* 1950, **40**, 1061-70, bibl. 5. [Cer. Crops and Diseases Div., Plant Ind. Bur., U.S. Dep. Agric.]

In trials with a large number of sorghum varieties, it was established that with only a few exceptions, the sorghums susceptible to *Sphacelotheca holci* (loose kernel smut of Johnson grass) were of known or probable feterita origin, but that neither the sorghum varieties of kafir-milo parentage nor varieties of sorgo, broom corn or sudan grass were susceptible to the pathogen. The rapid loss of viability of *S. holci* spores, the mode of infection and the resistance of most sorghum varieties suggest that *S. holci* is not a serious threat to the sorghum crop in the U.S. under present circumstances.——P.J.B.

364 WEBSTER, O. J. **Sorghum improvement. Effect of 2,4-D on sorghum varieties.** *Nebraska Univ. Agric. Expt Sta.* 63rd Ann. Rept 1950. 1950, pp. 41-2.

Three grain sorghum varieties, Martin, Midland and Coes were sprayed, 35 days after sowing, with solutions of 0.5 and 1.5 lb. per acre of 2,4-D amine salt in 40 gal. of water. The effects on plant growth following both rates of application were very slight; in the case of Midland only, were grain yields reduced following the 1.5 lb. per ac. rate of application. Fasciation of brace roots was pronounced in all plants treated at the 1.5 lb. per ac. rate, but despite the apparent retardation of root development, all plants stood well enough at harvest time to be harvested by combine. In further trials, 183 other sorghum varieties were sprayed 50 days after sowing with 0.5 lb. of 2.4-D butyl ester per acre. No effects on floral fertility or plant development were noted, except for brace-root fasciation. For weed control as a supplement to mechanical cultivation, it is recommended that 2,4-D applications to sorghum crops should not exceed 0.5 lb. per acre.—P.J.B.

RICE

365 HERKLOTS, G. A. C. **Chinese rice cultivation.** *World Crops* 1950, **2**, 321-4.

A description of traditional practices of rice cultivators in the New Territories of Hong Kong.—E.B.H.

366 VAILLANT, A. Le riz au Cameroun. [**Rice in the French Cameroons.**] *Agron. trop.* 1950, **5**, 606-21.

Rice cultivation (*Oryza glaberrima*) is of long standing in West Africa. From the regions bordering the Sahara this species migrated south towards the Guinea coast where it met with cultivations of *O. sativa* which had been introduced there by the Portuguese in the 15th century. In 1941 it was decided to extend the growing of *O. sativa* to all suitable regions in the French Cameroons to meet increasing local and export demands. To do this it will be necessary to develop mechanization. Rice growing is adapted to the different climatical conditions of Cameroons but it meets with a strong competition from root crops (*Manihot* and *Colocasia*) in the southern part of the country. Information is given on the climate, soil, culture, varieties and centres of rice cultivation in the French Cameroons. The mass selection of rice has been carried out at the Edéa Expt Sta., where rice yields varied from 28 to 39 q/ha., and at the Garoua Expt Sta., where yields were 14 to 40 q/ha. —E.B.

367 MIÈGE, E. La culture du riz au Maroc. [**Rice cultivation in Morocco.**] *C.R. Acad. Agric. Fr.* 1949, **35**, 664-6.

One method of rice cultivation utilizes fields of 4 to 5 ha. the land being prepared as for other cereals. Sowing is at the rate of 50 to 75 kg./ha. in drills 25 to 35 cm. apart. Part of the manurial dressing (NPK) is applied before sowing and the remainder, sometimes in solution, applied before the rice tillers. The varieties Balila and the American 1600 are high yielding, but as they are of mediocre quality they will shortly be replaced by the improved varieties Razza 77 and Senatore Novelli.

Harvesting is by combine harvester. Yields vary from 40 to 70 q./ha.

Another method favours areas of 0.5 to 0.20 ha. worked along the contour. Here the seed is broadcast at 200 kg./ha. (or drilled at 150 kg./ha.) in flooded land. Seeding is best done in March when the water temperature is 15°C. and the water covering 15 cm. deep. Where the " chergui " (a hot, east wind from the Sahara) is prevalent a water depth of 30 cm. is advisable. Yields vary between 37 q./ha (Razza 77) and 64 q./ha. (Balila) with an average of 62 q./ha.

In Larache transplanting of the rice gives higher yields and easier cleaning between the row, but involves more manual labour. Harvesting is done by reaping hook. Yields here are lower (30 to 50 q./ha.).—K.O.

368 GRILLOT, G. Expérimentation rizicole au Maroc. [**Rice trials in Morocco.**] *Terre marocaine* 1950, **24**, 489-93, bibl. 5. [Serv. Rech. agron. et Exp. agric., Maroc]

The first attempts to grow rice in Morocco started about 20 years ago in the Spanish zone. Some trials were carried out in the French zone during 1934-36 and these were followed by trials on a larger scale begun in 1948. An account is given of these last trials, which are still in progress. The experimental fields are kept flooded during the whole period of rice development which lasts from March until Sept./Oct. Damage by *Sesamia* was severe. Although no definite conclusions can be drawn from the first 2 years' trials, there were indications that : (a) transplanting of rice is not justified in this region, unless it is necessary to economize with water ; (b) organic manure increases the yield considerably ; (c) the variety Benlloch, which has been grown for over 20 years in the Spanish Morocco, is outyielded by Ardizzone, Sornavari and other varieties ; (d) Sornavari, which originated in the Niger region, is high-yielding but is late and lodges easily.—E.B.

369 TKATCHENKO, B. La riziculture en URSS. [**Rice cultivation in the USSR.**] *Rev. Bot. appl.* 1950, **30**, 278-97, bibl. 30, 1 map.

The historical development and the present situation of rice cultivation in the USSR are described. It is estimated that the area under rice is at present 230,000 ha. and the average yield 35 q. per ha. Information is given on the principal centres of rice cultivation, the varieties grown, the requirements of rice, the ecology of the rice districts, and the cultural methods employed.—E.B.

370 INDIA. Central Rice Research Institute, from Cuttack Annual Report 1948-9. Cuttack, 1950, pp. 38-40.

Experiments on double cropping, crop sequence, varieties suitable for first and second crop, and optimum time to plant the second crop, were initiated. Preliminary results indicate that the second crop must be planted after mid-December to avoid failures due to the incidence of pests and diseases. The first crop may be of short or medium duration, but the second must be of not more than 120 days at the maximum. Some of the China 100-day varieties showed great promise.—N.G.S.

371 BEVILACQUA, I. Il riso nelle " cuore " modenesi. [**Rice grown on clayey soil in the province of Modena.**] *G. Agric. Domen.* 1950, **60**. 295.

In this region there are large areas of hard, clayey, soils which were originally under water and have since been drained. They are at present under natural pasture. Rice cultivation was attempted over 12 ha. with good results, the yield being 62 q. of paddy per ha.—E.B.

372 LUNAN, M. **Small earth dams for the irrigation of rice fields.** *East Afr. agric. J.* 1950, **16**, 78-83, bibl. 1.

373 AGRONOMIE TROPICALE. Aménagements hydrauliques pour la riziculture au Soudan. [**Water management for rice cultivation in the French Sudan.**] *Agron. trop.* 1950, **5**, 401-2.

Brief information is given on the rice areas of the French Sudan and on the methods of growing rice in this region.—E.B.

374 CADA, E. **Observations on the resistance to flood of some varieties of rice.** *Philippine J. Agric.* 1950, **14**, 243-5.

Observations were made on the flood resistance of 5 lowland rice varieties subjected to three successive periods of flood. The mortality rates recorded indicate a wide difference in the flood resistance of different varieties, e.g. : Wagwag, 84 %, Raminad Str. 3, 79 % ; Ramai 61 % ; Elon Elon, 47 % and Seraup Kechil 36 to 40 %. Data are given of the effect of flooding on tillering and yield. Wagwag and Raminad had the highest tillering rates, 34 and 25 per plant respectively, and also the highest yields per plant.—P.J.B.

375 INDIA. Central Rice Research Institute, from Cuttack Annual Report 1948-9. Cuttack, 1950, pp. 5-9.

Twelve rice varietal trials, involving 82 varieties, were carried out. Benibhog yielded best of the Orissa beali varieties. In rices of 90-100 days growing season, the local varieties (Orissa) proved better than those from other provinces. The yields of two Madras varieties, Adt. 4 and Plr. 2, were depressed by the addition of 30 lb. N per acre in the form of ammonium sulphate. In rices of 100-110 days, the Chinese types China 45 and China 47 gave the highest yields. In 110-125 day rices, Adt. 9 yielded best. For 125-140 day rice, the control T. 1145 was significantly superior to others tried. The greatest response to 30 lb. N per acre (as ammonium sulphate) was given by Mtu. 5. In 170 day rices, BAM. 9 and T. 1242 significantly out yielded the control, T. 90, by 26 % and 16 % respectively. Of rices with a growing season of more than 170 days, PTB. 4 proved the best. In hybrid trials, the hybrid selections $\frac{1095/3}{15}$, $\frac{1995/3}{12}$, and $\frac{1095/3}{6}$ outyielded the control, T. 812, by 18 to 28 %.—N.G.S.

376 CAPINPIN, J. M., and YÑIGUEZ, T. M. **Behaviour of five Brazilian rice varieties [in the Philippines] under lowland culture in the College of Agriculture.** *Philip Agric.* 1950, **33**, 166-89.

Five rice varieties were tested. Dourado Agulha produced the highest percentage of filled grain, the largest grains, the least number of non-bearing culms, and "the heaviest individual weight of grains." It was also the earliest maturing. Perola produced the highest number of bearing culms, the greatest number of culms to a hill, and the heaviest weight of grain in a panicle. Jaguari, Iguape, and Cateto, in that order, were the least promising.—N.G.S.

377 INDIA, Central Rice Research Institute, from Cuttack Annual Report 1948-9. Cuttack, 1950. p. 27.

In seed treatment experiments, it was shown that mercurials like Agrano, Agrosan GN, and Granosan, in concentrations of 1/60, 1/30, and 1/15, by weight of seeds, were highly toxic and inhibited germination. Response to treatment of stored seed was found to be a varietal character. The varieties T. 412, GEB. 24, FR. 43B., T. 1145, ADT. 4 and Benibhog treated with Phygon and Spergon at a rate of 1/500 by wt. of grain gave a germination of 36 % and more. It was found that pre-seeding treatment with TMTD [rate not given] increased germination in the variety Co. 2 by 22 %.—N.G.S.

378 INDIA. Central Rice Research Institute, from Cuttack Annual Report 1948-9. Cuttack, 1950. p. 41.

Minimum strengths of 2,4-D and Methoxone required to kill water hyacinth [*Eichhornia crassipes*] are given. Experiments were carried out with Methoxone (10 % solution), Chloroxone (80 % powder) and Tufor (70 % acid powder) against weeds in field bunds. Two sprayings of three different concentrations [strength not stated] were carried out [presumably with each herbicide.] It was shown that weeds belonging to *Malvaceae*, *Sterculiaceae*, and *Vitaceae*, were highly susceptible; *Sesbania aculeata* showed some response; and *Mimosa pudica* gave an intermediate reaction; while the grasses, weeds of *Cyperaceae*, *Cassia tora*, *Croton sparsiflorus*, the *Euphorbiaceae*, and two weeds of *Tiliaceae* were unaffected. [It is presumed that all these effects pertain to all three herbicides, although, with the exception of the grasses and *Cyperaceae*, it is not so stated]—N.G.S.

379 PIACCO, R. Alghe in risaia. [**The algae of [Italian] rice fields.**] *G. Agric. Domen.* 1950, **60**, 411.

Two hundred and seventy-eight species of algae have been recorded in Italian rice fields. In Italy they are often removed by raking, but the best method of controlling them is by the use of copper sulphate in the irrigation water from sowing time. This is placed in a pierced container at the water inlet to the field, using about 1.2 kg. of crystals daily per ha., so that the concentration of copper sulphate in the water is 1 : 200,000, which is adequate to destroy the algae in the spore or vegetative stages.—E.B.

380 MIZUKAMI, T. **On the *Helminthosporium* disease resistance of rice seedlings treated with ether vapor. I.** [In Japanese] *Sci. Bull. Fac. Agric. Kyûshû* 1950, **12**, 5-4. bibl. 10. English summary, p. 4.

The resistance of rice seedlings to *Ophiobolus miyabeanus* was decreased by treatment with ether vapour.—N.G.S.

381 SACCAS, A. Un *Fusarium* parasite des panicules de riz. [**A *Fusarium* parasite of rice panicles.**] *Rev. Bot. appl.* 1950, **30**, 483-500.

In 1948 a *Fusarium* sp. seriously damaged the rice crops at Kaou and Kelengou, Ubangi, French Equatorial Africa. The fungus attacked the rice plants after flowering, and often destroyed the panicle completely. At Kaou, where 13 rice varieties from Madagascar were under trial, none of the varieties proved resistant to *Fusarium*, which caused yield losses varying from 60 to 90 %. It was observed that in the non-irrigated rice fields, where the air is drier, the degree of infection was lower than in irrigated fields. The following methods of control are suggested: the burning of rice stubbles, which propagate the fungus, the suspension of irrigation for 15 days to a month and the cultivation of the soil to eliminate the moisture which favours the development of the *Fusarium*. It is observed, however, that in the tropics the soil deteriorates if left exposed to the sun for a long period. An effective, but expensive, method of control is to disinfect the soil with formaldehyde or copper sulphate. The seeds produced on infected plots should be disinfected by soaking for 30 min. in an aqueous solution of 0.5 to 1 % formol, (40 % formaldehyde). Solutions at higher concentration (2 to 3 % formol) may be harmful to germination, unless certain precautions are observed, mainly washing the seed after treatment.—E.B.

382 CAMPACCI, C. A. A " Queimedura do Arroz." [**Blast of rice (in Brazil).**] *Biológico* 1950, **16**, 128-30.

The disease of rice known as " blast ", " burn ", " blight ", " rotten-neck " etc., is caused by the parasitic fungus *Piricularia oryzae*, often found in association with *Phoma* and *Helminthosporium*. Control can be obtained by : using clean seed, seed treatment with fungicides based on copper or mercury, flooding of rice fields to drown the fungus, liming, potassium and phosphoric manuring, the adoption of a sound rotation, burning, and by the destruction of alternate hosts.—N.G.S.

383 AMARAL, S. Franco do. A cultura do arroz e os " gorgulhos aquáticos " no Estado de São Paulo. [**Rice cultivation and water-weevils in the State of São Paulo, (Brazil).**] *Biológico* 1950, **16**, 73-82, bibl. 6, illus.

The water-weevils are *Lissorhoptrus foveolatus*, *Hydrotimetes* sp., and *Neobagous* spp. Experiments were carried out on controlling them with RB, DDT, and BHC. Most efficient control was given by BHC ; even when it was diluted to 1 : 1,600,000 a kill of almost 100 % of all types was obtained after 48 hrs. It is suggested that water-weevils might be controlled by estimating the amount of water in the (irrigated) rice field, adding sufficient BHC emulsion to give a dilution of 1 : 800,000, and then regulating the water supply so that the volume of water remains constant for at least 48 hrs. However, it is, considered more practical to dust the plants, in view of the water-weevil's habit of feeding on the leaves above the water-level. BHC dusts of 0.5 % and 2 % gave 20% and 36.7 % kills respectively of *L. foveolatus*, and a 83.6 % and 90 % kill of *Hydrotimetes* sp. after 48 hrs. BHC (gamma isomer) 0.5 % had no damaging effect upon the rice plants.—N.G.S.

384 RISBEC, J. Les *Hispidae* des plantes cultivées. [**The *Hispidae*, insect pests of crops.**] *Rev. Bot. appl.* 1950, **30**, 378-96, bibl. 37.

This review, based on previous works on the subject, describes the biology of these insects and the damage they cause to several crops, including rice, millet, and maize. Some control measures are described, particularly for *Hispa* spp. on rice.—E.B.

385 INDIA. Central Rice Research Institute, from Cuttack Annual Report 1948-9. Cuttack, 1950. pp. 28-35.

The rice variety GEB. 24 proved least susceptible to stem-borer [*Schoenobius incertellus*, *Sesamia inferens*, and *Argyria sticticraspis*] attack. Control of *Hispa* with Guesarol (50 % DDT.), gammexane (5 % BHC.), and Vivifex (50 % DDT and 30 % copper sulphate) was investigated. Guesarol diluted 1 : 20 with water gave 100 % kill of *Hisra* within 4 hours of spraying. Gammexane mixed 1 : 5 with talc powder gave 100 % kill of *Hisra* within 8-10 hrs. Vivifex, diluted 1 : 30 with water, gave the same results as Gammexane, but the plants revived better. The common method of treatment, passing kerosenated rope over the rice plants, proved ineffective.—N.G.S.

386 AMARAL S., F do. Ensaio de campo com hexaclorocicloexano, dicloro - difenil - tricloroetano e tiofosfato de dietila paranitrofenila para contrôle dos insetos da planta do arroz. [**Field experiment (in São Paulo) with BHC, DDT, and RB, for the control of insects on rice.**] *Arq. Inst. Biologico* 1950, **19**, 283-98, bibl. 15 + pl. 3. illus. English summary, pp. 296-7 [Inst. Biologico, São Paulo, Brazil]

It was shown that 0.45 % BHC, 5 % DDT and 0.5 % RB applied before the emergence of the rice, and 0.6 % BHC, 5 % DDT and 0.5 % RB dust applied on the rice plant, at rates of 250 kg/ha, had no influence on the growth or production of rice.—N.G.S.

387 YOSHII, H., and YAMAMOTO, S. **A rice nematode disease " Senchû Singare Byô." IV. Prevention of the present disease.** *J. Fac. Agric. Kyūshū* 1950, **9**, 293-310, bibl. 4. [Kyūshū Univ. Japan]

The nematode is *Aphelenchoides oryzae*. Improved manuring, modification of sowing date, and the use of resistant varieties are considered to be possible methods of control. Experiments were made on control by seed treatment, the methods tried being : chemical spraying at the earing stage ; chemical seed-treatment with chloropicrine and formalin and a modified hot water treatment. This last consisted of soaking the seed in cold water at less than 20°C for 16-20 hrs. then immersing in hot water at 51°C. for 7 mins. This gave effective control. Other times and temperatures tried affected the vitality of the seed adversely. The best time to carry out the treatment is discussed ; it is considered that it should be done not more than 60 days before sowing.—N.G.S.

388 PESSANHA, M. T. V. O abortamento floral no arroz cultivado de sequeiro nos solos de turfa. [**Floral abortion of unirrigated rice cultivated on peat soils (in Angola).**] *Agron. Angolana* 1948, No. 1, 44-61, [Received 1951]

Floral abortion is caused by excess nitrogen. Of the varieties Carolino, Cristal, Cnossbered, Coluza 180, Rosantabahor, Blue Rose, Lact Colony and Edit, the varieties Cristal and Edit were most resistant to this physiological disease, although they were also the most prone to lodging. In rich nitrogenous soils the practice of burning grass shortly before sowing seems inadvisable since it leads to the intensification of ammonification.—N.G.S.

389 MURRAY, D. B. **Photoperiodism in rice in Trinidad with reference to a second crop.** *Emp. J. exp. Agric.* 1950, **18**, 271-5, bibl. 4. [Dep. Agric., Trinidad, B.W.I.]

In an effort to secure increased rice production by growing two crops a year, experiments were initiated in Trinidad in 1947 with the following cropping plan: Early June: broadcast rice in the nurseries with the first rains. Early June: transplant to the swamp. Early October: broadcast nursery for the second crop. Early November: harvest first crop and plough immediately for the second crop. Mid-November: transplant second crop. Mid-March: harvest second crop, which would be brought to maturity by irrigation in January and February after the rains had ceased. The resulting yields in pounds of paddy per acre were: 1st. crop 4,080 and 2nd crop 1,380. The variety grown was Jowa and it was deduced that this was a season-limited crop (i.e. limited by photoperiod). Several other varieties were also tried, but they were all found to be limited by photoperiod. Further introductions are being made from Ceylon and India to find a variety adapted to the photoperiod of the second crop.—K.O.

390 PORTÈRES, R. Primitivité et progrès dans l'évolution au sein du genre *Oryza.* [**Primitive character and evolution progress in the genus *Oryza*.**] *Rev. Bot. appl.* 1950, **30**, 603-10.

An attempt is made to determine the primitive character and the degree of evolution in 20 *Oryza* species by taking into consideration the characters of the flower and panicle and the ecological type of the plant. The genus *Oryza* is divided into 4 sections The section *Sativa* includes the cultivated species. i.e., *O. sativa* and *O. glaberrima*, and several wild species. Among the last named are *O. fatua*, *O. breviligulata*, *O. barthii*, *O. madagascariensis*, *O. officinalis* and *O. minuta* the grain of which is collected for human consumption. The section *Sativa* appears to be more primitive than the other 3 sections which include non-utilized wild species. Some observations are made on the characters which develop under cultivation.—E.B.

391 WILLIS, W. H., and GREEN, V. E. **Movement of nitrogen in flooded soil planted to rice.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 229-37, bibl. 31. [Louisiana Agric. Expt Sta., Baton Rouge]

Greenhouse studies were carried out, using Lake Charles clay loam with a pH of 6.8 and Crowley silt loam with a pH of 5.6, to determine the nitrogen changes in flooded soil planted to rice. Fertilizer treatments on both soils were: 1. $CuSO_4$ (1-5 ppm as an algaecide) added to flood water. 2. 800 lb. per ac. of 0-12-12 (NPK). 3. 800 lb. per ac. 0-12-12 plus $CuSO_4$ in flood water. 4. 800 lb. per ac. 12-12-12. 5. 800 lb. per ac. 12-12-12 plus $CuSO_4$ in flood water. Grain yields were highest on the Crowley soil, where no fertilizer was applied, owing to its having a higher inherent nitrogen content than the Lake Charles soil. As compared to untreated controls, treatments, 1, 2, 3, 4, and 5 on the Crowley soil raised grain yields by 52, 90, 71, 100 and 124 %, respectively; on the Lake Charles soil, treatments 3, 4, 5 and 6 raised yields by 17, 33, 67 and 78 %, respectively. On the latter soil, the algaecide treatment had no effect on yields.—P.J.B.

392 ROLA, Nena A., and GALPEZ, N. L. **Effects of soil reaction on the growth of upland rice and on its nitrogen, calcium, phosphorus, and iron content.** *Philip. Agric.* 1949, **33**, 120-5, bibl. 13. [Received 1951]

A pH range of 5.7 to 6.2 was most suitable for the growth of the upland rice variety Inintiw.—Extract.

GENERAL

393 CAMBRIDGE, National Institute of Agricultural Botany. Seed Production Committee. Seed notes No. 33. **Supplement to the recommended list of cereal varieties.** 1950, pp. 6.

394 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. 'Growmore' Leafl. No. 48. **Cereal seed disinfection.** [n.d.] pp. 4.

395 KOLGANOV, K. G. [**Separation of biologically valuable grain in the process of threshing.**] [Russian] *Selek. Semenovod.* 1949. No. 9. pp. 44-9. [Čeljabinsk Mech. Inst.]

In wheat and rye seed formation occurs first in the middle part of the ear, and in oats and millet in the uppermost part of the panicle. Early formed seeds constitute particularly valuable sowing material and can be separated without mechanical injury during threshing by reducing the number of revolutions of the drum. It is then necessary to thresh the sheaves twice. At the first threshing, with a reduced number of revolutions of the drum, it is possible to collect through the concaves the grain to be used for seed. The sheaves are threshed the second time with the normal number of revolutions of the drum, and the grain is then used for food.—R.P.J.

396 Cambridge, National Institute of Agricultural Botany. Seed Notes No. 37. 1950. **Storage and drying of cereals for use as seed.** 1950, pp. 7.

397 Leblond, D. Les maladies des céréales dans le Québec. [**Cereal diseases in Quebec.**] *Agriculture, Quebec* 1948, **5**, 361-8. [Received 1950]

The author reviews the incidence of cereal diseases and some of the control measures taken against them at experimental centres in Quebec. Leaf diseases (*Puccinia* spp.), favoured by poorly-drained soils and too dense foliage, have been reduced by drainage and the use of early, resistant varieties. The heavy grain losses (20 %) resulting from sterility in oats and barley (due to *Ustilago* spp.) can be reduced by using good quality seed and by careful management and cultivation, but as yet no complete control has been discovered.—E.B.H.

398 Samoĭlov, I. I. [**Characteristics of nutrition of spring grain crops in connexion with the system of manuring the plants in rotation.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949, 61-72.

Spring grain crops (barley, spring wheat and oats) show marked differences in their response to fertilizers and in their nutritional requirements. The greatest response to fertilizers when applied in one dose to the soil before sowing is shown by barley, followed by oats and then by wheat. Divided applications of mineral fertilizers show a positive effect on the yield of wheat and oats but have no effect on barley. For oats, divided applications of NP fertilizers are most advantageous; similarly, for wheat divided applications of N. are best. The system of manuring for barley on podzols deficient in readily available forms of nutrients must provide, before sowing, for the application, by deep ploughing, of NPK. Where barley follows a break of perennial herbage (with a yield of hay of not less than 40 to 50 centners per ha.) the dose of N manure may be reduced to 20 to 30 kg. per ha. The system of manuring for wheat (with the same soil and cultural conditions as for barley) must include divided applications of N fertilizers (PK fertilizers having been ploughed in) with the application of part (from one-quarter to one-third of the total dose) in the tillering phase of the wheat. The system of manuring for oats, at least on seed plots, must provide for divided applications of NP fertilizers: from one-quarter to one-third of the total amount should be applied before booting.—R.P.J.

LEGUMES

SOYABEAN

399 United States, Department of Agriculture. Fmrs' Bull. No. 2024. **Soybean production for hay and beans.** By *W. J. Morse and others*. 1950, pp. 15.

400 Rompietti, A., and Rocchetti, G. Prove di orientamento e ricerche sulla soia. Nota preliminare. [**Indicative trials and investigations on soybean. Preliminary note.**] *Riv. Agric. subtrop. e trop.* 1949, **43**, 228-53, bibl. 25, English summary, p. 252. [Ist. agron. Afr. ital. Firenze]

Insufficient summer rainfall is the main adverse factor affecting this crop in Italy. Its cultivation has developed to a certain extent in the north. The results of trials carried out in Tuscany in 1947 and 1948 with 28 varieties (early, medium and late) are reported. Information is given on agricultural and vegetative behaviour, seed and straw production, and seed quality. Trials are to be continued.—E.B.

401 Bonnier, C. Formation de nodosités radiculaires, sur *Soja hispida* M., dans une terre dépourvue du *Rhizobium* spécifique. [**Formation of nodules on *S. hispida* M., in soil devoid of the specific strain of *Rhizobium*.**] *Bull. Inst. agron. Gembloux* 1950, **18**. 218-9, bibl. 3. [Inst. Agron. Gembloux Belgium]

The following observations have been made on the formation of nodules in legumes. In a plot experiment in 1948 with fifteen leguminous plants, including soyabean, all except the soyabean formed nodules. In the following year (1949), soyabean alone was sown over the whole experimental area. Not one plant formed nodules. In 1950, soyabean was again sown over the whole area. After 6 weeks' growth nodules (2 or 3 per plant) were visible only on those plants which were growing on the area originally sown to soyabean in 1948, that is, on the plot sown with soyabean for 3 successive years. These observations are recorded but no conclusions are drawn, beyond stating that it is possible a case of adaptation. Further investigations are in progress.—D.B.

402 Tilkin, F., and Laloux, R. Essai de culture du soja en Belgique. [**Cultivation of soybean in Belgium.**] *Bull. Inst. agron. Gembloux* 1949, **17**, 101-22, bibl. 10. [Inst. Agron., Gembloux, Belgium] [Received 1950]

The performance of 83 varieties of *Glycine soja* from various sources was studied in order to discover the varieties best suited to conditions in Belgium. The plants were studied chiefly for vegetative characters and for the effects of soil deficiency in phosphorus, nitrogen and potassium. Since experiments have been carried out, beginning in 1937, there has been ample opportunity to study the effect of rainfall and temperature. The best yields have been in dry years, but on the whole the climatic conditions, particularly the low average temperature and the high rainfall, are unfavourable for soyabeans. Not one of the varieties ripened early enough to be harvested before autumn or after approximately 125 days of growth. —D.B.

403 Gray, J. **Release of Louisana 41-1219 soybeans.** *Louisiana Agric. Expt Sta.* Ann. Rep. 1948-49, 1950, pp. 57-8.

Lousiana 41. 1219, a new selection, has given high forage yields in the cane areas of Lousiana, as well as an average seed yield of 26 bu. per acre over a 5-year period at Baton Rouge. The seed of this selection has an oil content of 21.3 %, and a crude protein content of 43.2 %, on a dry-matter basis. The seeds are of medium size (approx. 4000 per lb.) and have a prominent brown hilum, a valuable character for identification purposes. The seed pods are highly resistant to shattering. The variety matures seed by about November 1st at Baton Rouge, and satisfactory seed yields have been obtained from sowings made at any time during the period April to early June. Planting-date trials at Baton Rouge have shown that the late planting of late-maturing varieties facilitates combining, since the plants have a more upright growth habit than those from early sowings.—P.J.B.

404 United States Department of Agriculture. Tech. Bull. No. 1017. **Variability of agronomic and seed compositional characters in soybeans, as influenced by variety and time of planting.** By *M. G. Weiss and others.* 1950, pp. 39, bibl. 14.

The results are reported of two experiments at three locations to determine the effect of different sowing dates on the date of maturity, lodging, height, seed yield, seed size and the protein content, oil content and iodine number of the seed. The varieties used were Mandarin, Richland, Mukden, Mandell, Illini, Dunfield and Boone. Sowing dates were 1 May, and four succeeding dates, each 11 days apart. Of the two experiments, one was conducted for two years at Ames, Iowa: the other for three years at Ames, Iowa; Urbana, Illinois; and La Fayette, Indiana. The date of maturity was retarded by approximately one day for each three-days delay in sowing after 1 May, and the maturity of genetically early varieties was retarded more than that of late varieties. Lodging was not appreciably affected by sowing dates. Maximum height resulted from the second date of sowing and declined for succeeding sowing dates. The highest seed yields were obtained from those varieties that utilized the full growing season without incurring frost damage. The protein content of the seed did not vary with different sowing dates, the oil content of late maturing varieties was decreased somewhat by late sowing, and the iodine number of the oil of all varieties was raised considerably by late sowing.—From Authors' summary.

405 Illinois University Agricultural Experiment Station. **Fertilizer nitrogen improves yield and composition of soybeans.** *Illinois Univ. Agric. Expt Sta.* Report for 1947-49. p. 19.

The average yields of seed and protein from: (a) unfertilized check plots; (b) plots receiving 100 lb. of ammonium nitrate per acre; and (c) plots receiving 800 lb. of ammonium nitrate per acre, were 12.2, 17.3 and 22.5 bu. per acre of seed, and 288, 425 and 591 lb. per acre of protein, respectively. The average protein content of the seed from plots (a), (b) and (c) was 39.4, 40.9 and 43.8 %, with an average of 20.3, 5.8 and 1.4 root nodules per plant respectively. The highest seed yield of 23.2 bu. per acre came from plots receiving 400 lb. ammonium nitrate per acre.—P.J.B.

GROUNDNUT

406 Rossin, M. Deuxième compte rendu sur le développement du plan de culture mécanisée de l'arachide dans l'est africain anglais. (Situation en Mai 1949). (Suite et fin). [**Second report on the development of mechanical cultivation of groundnuts in British East Africa. (The position in May, 1949). (Last part).**] *Agron. trop.* 1950, **5**, 138-51.

[See *Fld. Crop Abstr.* 3, Abs. 926.]

407 Pickett, T. A. **Composition of developing peanut seed.** *Plant Physiol.* 1950, **25**, 210-24, bibl. 8. [Georgia Agric. Expt Sta., Experiment]

The Virginia Bunch strain of *Arachis hypogaea* was studied during the seasons 1947 and 1948 for composition of the developing seed and shell and for length of developmental period. " Fat and protein content increase only slightly on a percentage basis during the last 2 weeks preceding maturity; however, when calculated on a weight per seed basis, these constitutents increase considerably since the dry matter of the seed continues to rise. With the exception of reducing sugars present in the early stages in small amounts and later only in traces, sucrose is the only soluble sugar in the seed and is considered [to be] the transport sugar. The percentage of sucrose decreases as the seed develops; however, at maturity a slight increase in content of this sugar occurs. Starch also decreases as the seed ripens. The total percentage of sugars and starch approaches a constant value in the fortnight preceding maturity. The hemicellulose fraction increases throughout the development of the seed.

The ratios of protein-carbohydrate, fat-carbohydrate, and fat-protein increase as the seed develops. In the shell, hemicellulose increases throughout development, while the percentage of total dry matter, fat, crude protein, sugars, and starch decrease. From one season's results, it appears that Virginia Bunch peanuts require 130 ± 7 days from planting or 60 ± 7 days from the entrance of the gynophores into the soil to produce seed at the optimum stage for harvesting."—From author's summary.

408 Mallamaire, A. Les principaux insectes nuisibles et les maladies cryptogamiques des oléagineux alimentaires en Afrique noire. [**The principal insect pests and cryptogamic diseases of edible oil crops in tropical Africa.**] *Agron. trop.* 1950, **5**, 384-96, bibl. 38.

The oil crops considered in this brief review include *Arachis hypogaea*, *Sesamum indicum* and *Citrullus vulgaris*.—E.B.

409 Bouffil, F. Culture mécanique de l'arachide au Sénégal. [**Mechanical cultivation of groundnuts in Senegal.**] *Agron. trop.* 1950, **5**, 309-12.

PEA

410 Smith, H. N. **Singletary peas give promise as winter legume.** *Seed World* 1948, **63**, 42 and 44. [Soil Conservation Service, Fort Worth, Texas]

Introduced into Arkansas in 1942, Singletary peas (*Lathyrus hirsutus* var.) grow well on bottomland and slopes, particularly where the soil is slightly sandy. Soil inoculation is essential, and phosphate is generally applied at a rate of 300 lb. per ac. Sowing date is September 1-15 ; seeding rate, about 35 lb. peas per acre. The crop provides winter grazing as well as protection against soil erosion. It makes good quality hay and an excellent green manure.—E.B.H.

411 England and Wales, Ministry of Agriculture and Fisheries. NAAS., Advisory Leafl. 300. **Growing field peas for stock feeding.** 1950, pp. 5.

412 Ševčuk, T. N. [**Effect of nitragin on the yield of varieties of peas.**] [Russian] *Selek. Semenovod.* 1949, **16**, 50-5.

In field experiments, individual varieties of peas reacted differently to seed inoculation with nitragin. The varieties Kapital and Vjatskiĭ 39 gave an increase in height and in yield and there was a correlation between the amount of tubercles on the roots and the yield of seed and air-dried mass of the plants. The variety Viktoria Mandorfskaja showed a decrease in height compared with the control, a decrease in yield and no correlation between root tubercles and yield of seed. In all three varieties the length of the vegetative period was not affected by inoculation, but there was a more vigorous growth of the root system. The use of nitragin only increases the yield of, and protein content in, seeds of peas under conditions which take into account the varietal characteristics of the plant.—R.P.J.

413 England and Wales, Ministry of Agriculture and Fisheries, NAAS., Advisory Leafl. 357. **Peas for drying.** 1949, pp. 4.

414 Home Grown Threshed Peas Joint Committee. **Progress Report on Field Experiments 1945-1949.** Peterborough, 1950. pp. 27. bibl. 6.

Investigations reported :

(1) Manuring. pp. 4-7. N frequently improved the colour of the crop, but seldom had a positive effect on yield. P. is only necessary for peas on land acutely deficient in readily soluble phosphorus. K is the most important nutrient for peas—yield increases followed K treatment in 18 out of 25 experiments. A potassic-superphosphate fertilizer, with high potash content, is the most suitable general fertilizer for peas. Sowing fertilizers in contact with pea seed in combine drills results in damaged and killed seedlings, especially under dry seedbed conditions. Side-band placement proved the best method of applying fertilizer to the crop.
(2) Varieties. pp. 7-9. Servo, a large blue, outyielded other varieties tried. Emigrant outyielded Zelka (both Dutch marrowfat varieties).
(3) Fungicides, pp. 9-12.
(4) Date and depth of sowing, pp. 12-14. Sowing should be done as early as reasonably possible.
(5) Spacing and seeding rate. pp. 14-16. Optimum spacing between seeds within the row lies between 2-3 in., irrespective of row width.
(6) Weed control. pp. 17-22. DNBP was a most promising material for weed control in peas. 2 cwt. MCPA powder is normally more efficient than 1 cwt. per acre. Treatment with DNBP at 1 to 1.7 lb. per acre and hoeing both gave better weed control than MCPA at 1.5 and 2.5 cwt. per acre.
(7) Pest control. pp. 22-4.
(8) Irrigation, pp. 24-5. Irrigation resulted in higher yields of peas, in spite of a greater weed population.
(9) Other trials. pp. 25-26.—N.G.S.

BEAN

415 MARINUCCI, M. L'orobanche. [***Orobanche crenata* Forsk.**] *G. Agric. Domen.* 1950, **60**, 221.

A trial carried out in the region of Perugia, Italy, has confirmed that sowing *Vicia faba* at a depth of 10 to 12 cm. considerably reduced its infestation by *Orobanche crenata*.—E.B.

416 OLDERSHAW, A. W. **The cultivation of field beans.** *Farming* 1950, **4**, 145-9, bibl. 8.

Bean stem rot (*Sclerotinia* spp.), chocolate spot, balck aphis and bean weevils have been important factors in causing a decline in the cultivation of field beans in Britain. It is suggested that insufficient time between bean crops has contributed to the spread of *Sclerotinia*. Insufficient attention has been paid to improving the strains and varieties of field beans. Of fertilizer treatments, farmyard manure gives the highest yields on most soils, and farmyard manure plus phosphates, on heavy land. Where farmyard manure is not available, P and K should be used. Nitrogenous manures are unnecessary. Spring beans may be grown in mixture with oats (' mashlum ') or with feeding peas. (' blending ') ; this helps to minimise the effects of disease.—N.G.S.

OTHER

417 ROSBORG, S. Halten bittra frön i gul sötlupin. [**The content of bitter seeds in yellow sweet lupin.**] *Medd. Frökontrollanst., Stockh.* 1950, No. 25, 46-9 English summary p. 49.

Sweet lupin was introduced into Sweden in 1935. Yellow sweet lupin (*Lupinus luteus* L.) is the species most commonly grown. Analyses to determine the content of bitter seeds have been conducted at the Central Seed Testing Station since 1945. For state sealing, the permitted proportion of such seeds is 5 %. During the year 1945-46 only 9 % of the samples exceeded this limit, but in 1948-49 the corresponding figure was 87 %. The mean content of bitter seeds per sample increased continuously during the four years in question from 3 to 9 %.—R.P.J.

GENERAL

418 SMITH, F. W. **Some relationships of boron to the growth of legumes on South-eastern Kansas soils.** *Proc. Soil Sci. Soc. Amer.* 1948. 1949, **13**, 258-61, bibl. 3.

419 TERZAROLI, Anna Laura. Sull'assimilazione simbiotica dell'azoto atmosferico. [**The symbiotic assimilation of nitrogen from the air.**] *Humus, Milan* 1951, **7**, No. 1, 10-2.

An account is given of some favourable results obtained in Italy from inoculating the seeds of leguminous plants with a propriety preparation of *Bacillus radicicola*. The need of further research in this field is stressed.—E.B.

ROOTS

SUGAR BEET

420 ALDROVANDI, A. Ricerche sull'investimento delle piante con diverse varietà di barbabietole da zucchero. [**Research on spacing with different varieties of sugar beet.**] *Industr. saccar. ital.* 1950, **43**, 186-92, bibl. 16.

The spacing of sugar beet in Italy averages 10 plants per sq. m. A trial was carried out in 1949 at Corticella, Bologna, on soil of high fertility, with 5 varieties characterized by high root-weight or by high sugar-content, each being grown at 6 spacings varying from 7.4 to 15.15 plants per sq. m. Spacing at harvest varied correspondingly from 6.63 to 10.78 plants per sq. m. All the varieties behaved similarly in that with lower density, the unit weight of the roots increased proportionally to the greater space available for each plant, this increase being at the rate of 40 grm. per. sq. dm. Contrary to expectations, the sugar-content of the roots did not decrease proportionally to the increase in weight. It is therefore concluded that on soils of high fertility, the possibility of increasing sugar content by appropriate spacing of the plants does not exist. The problem is to maintain a regular stand by avoiding losses amongst young plants. The trial has confirmed that the seed-rate should be about 1 grm., that is about 50 seed-clusters, for every lineal metre in the row. This is equivalent to 25 kg./ha., if the distance between the rows is 40 cm., or 30 kg./ha if the distance is 33 cm.—E.B.

421 EBBESEN, Ejnar. Hvordan gaar det, hvis Roerne sidder aftoppede en Tid i Jorden? [**What happens if roots of fodder sugar beet and sugar beet are topped and left in the ground for a time?**] *Ugeskr. Landm.* 1950, **95**, 155-6. [Naesgaard Agricultural School, Denmark]

The trials included 3 treatments : (a) early topping (from 19 to 25 Sept.) ; (b) medium-early topping (from 5 to 29 Oct.) ; (c) topping when lifted (from 20 to 29 Oct.). All 3 treatments were lifted at the same time. The yield of roots and their percentage dry matter rise the longer they retain their tops. The average yield (hkg. per ha.) of dry matter in the 3 treatments was : (a) 101, (b), 117 ; (c) 129.—R.P.J.

422 LEENHEER de L., and SIMON, M. La production relative en betterave sucrière de différents types de Polders Marins en 1949. [**Relative production of sugar beet in different types of maritime polders in 1949.**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 129-43, bibl. 27. [Inst. Agronomique, Gand (L. de L.) and Inst. Betterave, Tirlemont (M. S.)]

The importance of the relationship between soil and beet yield has been confirmed in investigations carried out in 1949. One thousand roots per soil type provided the sample. A layer of pure sand at a depth of 0.6 m. is so harmful for beet growth that yield of sugar is about half that on the best soils.—D.B.

423 WAUTHY, R. L'arrosage et l'irrigation appliqués a la betterave sucrière, en 1948 et 1949. [**Sprinkling and irrigation as applied to the sugar beet in 1948 and 1949.**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 145-53, bibl. 8.

Water is a limiting factor in sugar beet production. Results of experiments carried out during the past 17 years have shown that, whatever the weather, irrigation was followed by increased yields, the average increase being 16.2 %. The technique employed and the correct timing of irrigation are more important than the quantity of water applied. Only two systems are permissible: furrow irrigation and sprinkling. Whichever method is used the water must not be allowed to stand and the flow must be such as to avoid erosion. The amount of water required has first to be calculated (taking all factors into consideration) and then applied at frequent intervals between mid-June and mid-August. The application of green manure and farmyard manure aids in water retention. The nematode population of the soil presents one of the dangers of irrigation. At present irrigation of beet fields appears to have limited application in Belgium.—D.B.

424 SIMON, M. Comment choisir les variétés de betterave sucrière? [**How to choose varieties of sugar beet.**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 3-14, bibl. 1.

This is the annual popular article written for beet growers. [See also *Fld Crop Abstr.* 3, Abs. 470 and 471.] Hopes for the future lie in polyploid forms and in the selection of varieties resistant to disease, particularly "yellows."—D.B.

425 JOSEFSSON, A. Resultat från 10 års prövning av Svalövs fodersockerbeta Solid. [**The results of 10 years trials with the fodder sugar beet variety Solids.**] Sverig. Utsädesfören. Tidskr. 1950, **60**, 434-9.

In trials during 1940-49 at five locations in Sweden, the fresh weight and dry-matter yields per ha. and the dry-matter content of the roots of the variety Solid were compared with those of Nova, Milka, Särimner III, Regia, Svea-Rex, Monark and Gullåker. The average results from 34 tests with Solid, Nova and Milka respectively, were as follows: fresh weight yield of roots, 614, 652 and 617 deciton (100 kg.) per ha; dry matter yield of roots 109, 104 and 108 deciton per ha; dry matter content of roots 17.77, 16.04 and 17.54 %. The average percentage of bolting for Solid, Nova and Milka in 31 trials, was 0.6, 1.4 and 1.0 %, respectively. Solid was generally released to farmers in 1949 and is described as having a short, full-bodied root with a wide neck. It has a large crown that stands well out of the ground, making this variety easy to harvest and easy to weed. Some of the latest selections of Solid contain a higher percentage of dry-matter than the earlier selections used in these trials.—P.J.B.

426 DANILOVA, T. A. [**The effect of treating sugar beet seed with heteroauxin on yield and biochemical processes.**] *Doklady Akad. Nauk SSSR* 1950, **72**, 801-4. [Russian] [All-Union Sci. Res. Inst. Fert., Agrotech. and Pedology]

Experiments conducted during 1946-49 showed that treatment of sugar beet seed with heteroauxin changes the course of biochemical processes in sugar beet plants, and this, in its turn, leads to an increase in yield.—R.P.J.

427 ERNOULD, L. Les ennemis de la betterave, en Belgique, en 1949. [**Enemies of the sugar beet crop in Belgium in 1949.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 221-30, bibl. 11.

428 ERNOULD, L. La maladie de l'étranglement de la betterave. [**Strangles disease in beet.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 231-6, bibl. 8.

A disease of sugar beet, which is characterized by a constriction of the plant below the foliage about soil level, appeared in several sugar beet growing regions in Belgium in the spring of 1949. The disease finally results in the abscission of the aboveground part and is caused by unfavourable weather (night frosts accompanied by dry wind) at thinning time. The only known method of control is the eradication of diseased plants. At thinning time the healthy plants can be distinguished by their erect petioles and the diseased ones by curved petioles.—D.B.

429 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 323. **Sugar beet yellows.** 1950, pp. 7.

This virus disease is mainly transferred to plants of the sugar beet family by the green peach-potato aphid, *Myzus persicae*. Control measures include, (1) growing the seed crops away from virus-infected root crops, and (2), in heavily infested areas, undersowing the stecklings in April with a protective, cover-crop of barley or linseed. Early sowing and fairly thick planting (from 25,000 to 30,000 plants per acre) are recommended for the general crop. So far no virus-resistant strains of sugar beet have been developed.—K.O.

430 HULL, R. **Virus yellows: need for healthy stecklings.** *Brit. Sugar Beet Rev.* 1950, **18**, 107-11 and 118. [Rothamsted Expt Sta.]

Experiments on control measures in seed crops have followed several lines; the method giving the best results being to raise the stecklings in areas relatively free from aphides and without sugar beet and mangold crops. The use of a cover crop, and the spraying of stecklings with a persistent, systemic insecticide have also given encouraging results, but further research is necessary. Tables are included showing the mean percentage of infection in sugar beet in Great Britain.—E.B.H.

431 ERNOULD, L. La graine de betterave transmet-elle la jaunisse et la mosaïque? [**Does the sugar beet seed transmit virus yellows and mosaic disease?**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 89-94, bibl. 27.

There is very little evidence for the transmission of virus yellows or mosaic disease through the beet seed. Of the varieties tested the only one which appeared to show heavy transmission was the Irish variety No. 41. (There was, however, some doubt that the disease in this Irish variety was actually virus yellows.) An explanation of non-transmission through the seed lies in the localization of the disease in the phloem and the absence of phloem connexion between the embryo and other tissues of the seed.—D.B.

432 RASKI, D. J., and others. **Sugar beet nematode chemical control trials test two methods of applying soil fumigants.** *California Agric.* 1951, **5**, 6 and 15. [California Univ. Agric. Coll., Berkeley]

In trials near San Juan on a nematode-infested light soil with a moisture equivalent of 20.6, the average sugar beet yield of untreated check plots was 4.5 tons per acre; the average yields of plots receiving chisel-type and plough-type seed-bed applications of 250 lb. of dichloropene mixture per acre, were 12.1 and 16.4 tons per acre, respectively. Data are given of soil profile nematode counts for treated and untreated plots. The cost of the plough-type applications fumigant was relatively high. Owing to the reduced effectiveness of fumigation in soils heavier than those used in the above mentioned trials, it is not yet considered possible to make practical recommendations for the use of soil fumigants against sugar beet nematode in California.—P.J.B.

433 WATZL, O. Zur Lebensweise und Bekämpfung des Rübenerdflohs (*Chaetocnema tibialis* Illig). [**The habits and control of the beet flea beetle.**] *PflSchBer.* 1950, **4**, 129-49, bibl. 18. [Bundesanstalt für Pflanzenschutz, Wien]

In the spring of 1948 the flea beetle did considerable damage to the sugar beet seedlings in eastern Austria and necessitated investigations in control measures. The insecticides tested were evaluated by a new and objective method based on the number of "eaten" areas. In order to reduce the time spent on counting thousands of such areas on a plant and to avoid the tedious work of distinguishing, with a hand lens, between the old "eaten" areas (before treatment) and the new ones (after treatment), only the youngest pair of leaves on each plant was examined. This was considered to give an adequate and accurate sample. Dusts and sprays containing DDT gave better results than preparations of an ester of phosphoric acid, nicotine or arsenic. The flea beetle often overwinters some distance from the beet fields; for instance in the upper layers of the soil of an open pine wood. The depredations of this pest vary from year to year, being dependent on weather.—D.B.

434 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 233. **Beet eelworm.** 1950, pp. 6.

As no satisfactory chemical treatment has yet been discovered for the control of the eelworm (*Heterodera schachtii*), clean cultivation methods and the application of suitable crop rotations are the best methods of control.—K.O.

435 ERNOULD, L. Le traitement de la graine de betterave contre les larves de taupin. [**Treatment of the beet seed to kill wireworm larvae.**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 95-106, bibl. 9.

Benzene hexachloride kills the larvae of wireworms. Experimental evidence is presented which shows that yields of sugar beet were increased when the chemical was applied to the soil (680 grm. of the gamma isomer per ha.), but not when dusted on to the seed. Further experiments are in progress.—D.B.

436 MAKAROV, B. M. [**Daily course of photosynthesis and respiration in sugar beet in the course of the vegetative period.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, No. 1, 185-7.

The intensity of photosynthesis and respiration of plants fluctuates during the vegetative period and in the course of 24 hours. In the work reported an attempt was made to determine the daily course of photosynthesis and respiration in sugar beet and the changes in these processes during growth. Tabulated data on photosynthesis and respiration during 14th and 16th July, 1949, show that the daily course of these processes has the character of a single-apex curve with the maximum about midday. The daily course of respiration is connected with changes of temperature, the maximum being observed during the hours of increased temperature. Intensity of true photosynthesis and respiration is considerably higher in the young plant (June and July) than in the more mature plant (August and September).—R.P.J.

437 SIMON, M. Le chaulage des terres à betterave. [**Liming of soils for beet.**] *Publ. Inst. belge Amélior. Better.* 1950, **18**, 57-84, bibl. 67.

This is very largely a literature review in which is discussed the effect of soil acidity on development, diseases and yields of the sugar beet, and the need for liming. The rest of the paper is purely of soil interest.—D.B.

438 SIMON, M. Le manganèse et la betterave sucrière. [**Manganese and sugar beet.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 211-20, bibl. 33. [L'Institut Belge pour l'Amélioration de la Betterave, Tirlemont]

The aim of the article is to keep sugar beet cultivators well informed as to the importance of manganese for the sugar beet crop and the remedies which can be applied to soils deficient in available manganese. This deficiency is becoming more apparent in the beet growing areas of Belgium though it is not yet a serious problem. Sugar beet is very sensitive to manganese deficiency, the symptoms of which are reviewed. The harmful effects of the deficiency can be minimized by progressively reducing the alkalinity of the soil, in particular by not liming alkaline soil (still observed in some parts), by treating the soil with a solution of manganese sulphate at the first onset on deficiency symptoms, by returning organic matter to the soil to increase its water reserves and by paying attention to the manganese economy in the grassland break of the rotation.—D.B.

439 CROWTHER, E. M., and GARNER, H. V. **Nitrogen fertilizers for sugar beet.** *Brit. Sugar Beet Rev.* 1950, **18**, 101-5. [Rothamsted Expt Sta., Harpenden, Herts.]

See *Fld Crop Abstr*, 1, Abs. 389.

440 SILSOE, National Institute of Agricultural Engineering. **The lifting and loading of sugar beet.** By *H. C. Green* and *F. S. Mitchell.* 1950, pp. 22. [Mimeographed]

A report of investigations carried out in 1946 to provide information on mechanical and hand methods of lifting, topping and loading sugar beet. —P.J.B.

TURNIP

441 LONDON, BORAX CONSOLIDATED Ltd. **Brown heart disease in swedes and turnips, and its prevention.** [**n.d.**] pp. 3.

442 FUKUSHIMA, E., and UEMOTO, S. **On the effect of vernalization in Tokinashi-Kokabu, a Japanese turnip (*Brassica rapa*).** *J. hort. Ass. Japan* 1950, **19**, 9-12.

STARCH PLANTS

443 ANGLADETTE, A. Situation et avenir de la production du manioc dans les territoires d'outre-mer de l'union française. [**Situation and future of cassava production in the oversea territories of the French Union.**] *Agron. trop.* 1950, **5**, 193-7.

444 SWAINE, G. **The biology and control of the cassava scale.** *East Afr. agric. J.* 1950, **16**, 90-3. [Dep. Agric., Tanganyika]

An experiment is described which was undertaken to test the efficacy of varying concentrations of DDT oil emulsion in controlling the infestation of the scale insect *Aonidimytilus albus* on heavily attacked cuttings of cassava. The cuttings were dipped for 5 minutes in one of the following solutions and allowed to dry completely before planting : (a) Control—no DDT, (b) 2 % DDT, (c) 1 % DDT, (d) 0.5 % DDT, (e) 0.25 % DDT, and (f) 0.1 % DDT. Each treated cutting was planted in contact with a " clean " (untreated and unattacked) cutting. Counts of live adult female scales were made after planting on ten " clean" cuttings selected at random in each row. These scales were derived from crawlers which had passed across from the treated cuttings in contact with the " clean " cuttings and the numbers recorded therefore gave a measure of the killing and residual properties of the treatment. Results showed that while DDT did effect good control at all concentrations, it was observed that the germination of both treated and untreated cuttings which had all originally been heavily infested was extremely poor (1.2 % germination). The most successful method of control of infestation was to select only clean planting material and to uproot and burn any infested cassava remaining in the field at the time of planting. The insect predator *Chilocorus distigma* is of most value in controlling infestation when heavy populations of the scale-insect have developed.—K.O.

445 Miège, J. Caractères du *Dioscorea minutiflora* Engl. [**Characters of *Dioscorea minutiflora* Engl.**] *Rev. Bot. appl.* 1950, **30**, 428-32.

In the tropical forest regions of West Africa there are several wild species of *Dioscorea*, including *D. minutiflora*, *D. smilacifolia* and other closely related species. A general description of these is given. —E.B.

446 Davey, J. T. **Review of entomological work in Nigeria 1935-48.** *Farm For.* 1950, **10**, 10-18.

The yam beetle (*Heteroligus claudius.*) is a serious pest in some years in the Eastern half of the Western Provinces of Nigeria. As a control measure late planting has been advised to escape the migratory period of the vector but, in some cases, this leads to a shortage of seed yams. The production of varieties of cassava resistant to mosaic disease and *Bemisia nigeriensis* is being carried out at Ibadan and it is thought that the planting of diseased material is the main factor responsible for the northwards spread of the disease. Measures recommended for the control of bruchid beetle, *Caryedon fusca*, infesting groundnuts are: the destruction of all old nuts after the planting season is over, the cleaning of "rumbas" [stores] and the burning of refuse at least a month before harvesting begins, and the drying of the nuts in the field (not in compounds or near villages) before storing. —C.L.S.

FIBRES

COTTON

447 Oklahoma Agricultural Experiment Station. Bull. No. B-358. **Cotton growing in south-eastern Oklahoma. A comparison of present methods and recommended practices.** By *W. F. Lagrone*. 1950, pp. 32.

448 Ganesan, D. "**Agronomic effect**" **on the quality of cotton seed.** *Indian Cott. Grow. Rev.* 1950, **4**, 167-72, bibl. 2. [Inst. Plant Indust., Indore]

More and better quality seed was obtained from widely spaced and un-fertilized cotton, than from a closely spaced crop fertilized with ammonium sulphate.—N.G.S.

449 Dastur, R. H. **Investigations on the 'bad opening' of bolls in Sind-American cottons in Sind. I. Causes and the remedial measures for bad opening.** *Indian J. agric. Sci.* 1949, **19**, 401-11, bibl. 5. [Indian Central Cotton Committee, Bombay] [Received 1950].

Investigations were conducted in Sind to determine the causes of 'bad opening' of bolls containing immature seeds and weak fibre in Sind-American cottons. Late sowing was found to be a common remedy for 'bad opening' on both the soil types considered.—From author's summary.

450 India. Institute of Plant Industry, Indore. **Progress Report for the year ending 31st May, 1949.** Indore, 1950, pp. 6-9 and 55.

At Indore, Malvi 10 (M9 × Bani) and Malvi 12 (M9-20 × V. 438) gave the best results of the desi cotton varieties tried. In a preliminary varietal trial, P.B. 9 (M9 × Jarila), P.B. 13 (M9 × V. 434), P.B. 3 (Jarila × Bhoj) and P.B. 11 (M9 × V. 434) proved promising. Selection, bulking and segregation of bulk continued. The best American cotton variety, both at Badnawar and Indore, was Indore 3, P.B. 5 (Buri 107 × Co2). Indore 2 cotton was superior to Dhar Cambodia in field trials in Madhya Bharat. Tabulated results of cotton varietal trials at nine different centres in Malwa, Nimar, Nemawa and Rajasthan are given in Table 2 (p. 55).—N.G.S.

451 Ansari, M. A. A. **The situation and outlook for cotton production in the U.P., vis-a-vis partition of the country [India].** *Indian Cott. Grow. Rev.* 1950, **4**, 149-53.

The two varieties C.520 and 35/1 are superior to the local varieties in the United Provinces.—N.G.S.

452 Naude, T. J. **Cotton—insect problems.** *Fmg S. Afr.* 1950, **25**, 349-51.

An account is given of the pests of cotton in Africa and the various control measures to be adopted. The pests include red bollworm (*Diparopsis castanea*), spiny bollworm (*Earias* sp.), American bollworm (*Heliothis armigera*), stainers (*Dysdercus*), aphids (*Aphis gossypii*), mites or redspider, jassid beetle (*Empoasca* sp.) and syagrus beetle. Recommendations are made as to the type and amount of insecticide to be used in control measures, the time of application and the approximate cost of applying each insecticide per acre.—K.O.

453 Lepage, H. S., and Giannotti, O. Recomendações do Instituto Biológico para o combate às pràgas do algodoeiro, no ano agricola 1950-51. [**Recommendations of the Instituto Biologico (Brazil) for combating the pests of cotton in the agricultural year 1950-51.**] *Biológico* 1950, **16**, 139-45.

Precautions to be taken to avoid accidents are set out. The characteristics of various insecticides are briefly noted. These are then tabulated against various pests, and their efficiency of control recorded. Tables are given both for powders and sprays.—N.G.S.

454 Agricultural Chemicals. **Cotton Insect Conference at Memphis (U.S.A.). 1951 recommendations.** *Agric. Chem.* 1951, **6**, 39-41.

Provisional recommendations are made for the chemical control of the boll weevil, *Anthonomus grandis*, the bollworm, *Heliothis* spp., the cotton aphis *Aphis gossypii*, thrips and the pink bollworm *Pectinophera gossypiella.*—P.J.B.

455 RICHTER, R. A. Estudio de la relacion peso de la semilla × altura de las plantas y produccion en el algodonero. [**Study in the relation between seed-weight and plant height and production in cotton.**] *Agricultor Venez.* 1950, **15**, 20-1, bibl. 5.

The weight of seeds produced by cotton plants of different heights, but of the same variety, is proportional to the height of the plant. The height and production of plants of the same variety are not influenced by the weight of the seed from which they were grown.—N.G.S.

456 MISSISSIPPI Agricultural Experiment Station. Bull. 473. **Soil fertility practices for cotton production in the Yazoo-Mississippi delta.** By *P. H. Grissom.* 1950, pp. 23.

457 TEXAS Agricultural Experiment Station. Bull. 723. **The effect of cleaning on the grade, staple and price of cotton.** By *M. A. Grimes.* 1950, pp. 38.

458 GREEN, J. M. **Variability in the properties of lint of upland cotton.** *Agron. J.* 1950, **42**, 338-41.

459 EMPIRE COTTON GROWING REVIEW. **Empire Cotton Growing Corporation 1921 to 1950.** *Emp. Cott. Gr. Rev.* 1951, **28**, 2-43.

An account is given of the Corporation's work in the Anglo-Egyptian Sudan, Uganda, Kenya, Tanganyika, Nyasaland, Northern and Southern Rhodesia, South Africa, Nigeria, West Indies, Australia, Fiji, India and Pakistan.—K.O.

FLAX

460 REMUSSI, C. La producción de lino textil en la Argentina. [**Flax production in Argentina.**] *Ciencia Invest.* 1951, **7**, 51-66, bibl. 12. illus.

461 FORTIN, D. Étude des rendements obtenus dans la production de lin du Québec. [**Study of yields obtained in the production of fibre flax in Quebec.**] *Agriculture, Québec* 1948, **5**, 349-58, bibl. 11. [Received 1950]

462 BLASZYK, P. Unkrautbekämpfung im Flachs. [**Control of weeds in flax.**] *NachrBl. dtsch. PflSchDienst Braunschweig* 1950, **2**, 140. [Pflanzenschutzamt, Oldenburg in Aurich]

Weeds in stands of flax (*Linum usitatissimum*) not only reduce yields but also make harvesting difficult. Trials in eastern Friesland have provided information on weed control measures for flax stands 25 cm. high. Hand weeding is costly and has to be done at a time when farm labour is scarce. The herbicide U 46 is not only extremely costly but also damages the fibres. The most promising herbicide, and also the least costly, is the preparation known as Gelbspritzmittel.—D.B.

HEMP

463 BARBIERI, R. Il problema del seme. [**The seed** (*Cannabis*) **problem.**] *Canapa* 1950, **3**, No. 2, p. 1, bibl. 4.

Before the war, the specialized growing of *Cannabis sativa* for seed was beginning to develop in Campania, Italy. The varieties grown were Carmagnola and Bolognese both from northern Italy. During the war the situation deteriorated and now poor quality seed is often employed. The reorganization of local seed production is advocated. Cultural methods are briefly described.—E.B.

JUTE

464 KAPRALOVA, N. P. [**Native varieties of jute.**] [Russian] *Selek. Semenovod.* 1950, **17**, 42-7. [Uzbekistan Expt Sta. Inst. Fibre Crops]

Jute is a short-day plant. With daily illumination of 10 to 12 hours, development is accelerated by 32 to 33 days, and the plants become stunted. Sowings made on the same date may give markedly different results in different years. With early sowing (end of March), some varieties of long-day jute (0420, 0421, 345) show a great diversity in behaviour of the plants within the variety (from ultra-early maturing to late maturing forms, and from procumbent to tall forms), whilst varieties biologically adapted to early sowing dates (028,064,065) produce stems uniform in growth and development. Investigation of varieties of jute in a March sowing in 1947, when the temperature in April was considerably below the average of many years, showed that under these reduced temperatures the biological differences are levelled out. In this case, the marked acceleration in development obtained in both varieties is almost identical. The most important factor in determining the duration of the growing period up to flowering in varieties of long-day jute is the temperature regime. Early sowing dates under conditions of reduced temperatures with unadapted varieties cause acceleration in development of the plants. A reduction in temperatures results in accelerated development also in varieties biologically adapted to comparatively early sowing dates.—R.P.J.

OTHER

465 ANTYKOV, A. Ja., and VSEVOLOŽSKAJA, G. K. [**Varieties of *Abutilon* for the central zone of the USSR.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 4, 63-5.

In certain cases *Abutilon* can serve as a substitute for jute and kenaf. As a result of experiments, initiated in 1927, at the Institute of Fibre Crops and its branch station in Krasnodar, it is now possible to obtain high yields of *Abutilon* (12 to 16 centners of fibre per ha). Data from experiments conducted in 1948 on forest-steppe dark grey argillaceous soil, with and without complete mineral manures, show in both cases that the highest yield of fibre is given by the variety 091, with Manjčžurskiĭ (a later-ripening variety) occupying second place and the early-ripening variety 085 third place. On the basis of yield, height, non-branching of stems, percentage of fibre and fibre strength the varieties 091, 07 and 452 are the most promising for the central zone of the USSR.—R.P.J.

OIL CROPS

LINSEED

466 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. 'Growmore' Leafl. No. 13. **Home-grown linseed.** 1950, pp. 4.

OTHER

467 ILLINOIS UNIVERSITY Agricultural Experiment Station. **Castor seed production.** *Illinois Univ. Agric. Expt Sta.* Report for 1947-48. p. 35. 1950.

In castor oil plant (*Ricinis communis*) trials during 1944 to 1947, two varieties, Conner and a selection from Kansas Common, Illinois No. 1, were grown as an annual field crop at four locations in Illinois. The average yields of hulled seed for Illinois No. 1 and Conner for the trial period, were 1062 and 977 lb. per acre, with an oil content of 53.6 and 53.4, respectively. Conner and Illinois No. 1 were the most promising of all the selections tested and appeared to be adapted to sandy soils and soils of low fertility. The highest yields in spacing trials were obtained from plants spaced 10 to 20 in. apart, in rows 40 in. apart. The existing varieties are not adapted to combine harvesting by reason of their bushy habit, their irregularity in time of seed maturation and their liability to seed-pod shattering. Further selection will be necessary to eliminate these disadvantages.—P.J.B.

468 ANDERSSON, G., and OLSSON, G. Försök med oljedådra—*Camelina sativa*, Crantz. [**Field trials with *Camelina sativa*.**] Sverig. Utsädesfören. Tidskr. 1950, **60**, 440-58, bibl. 23. English summary.

In trials, during 1947-49, on peat and mineral soils at 17 locations in Sweden, the average seed yields of the selection Sv 0700 of Gold of Pleasure (*Camelina sativa*), white mustard and summer rape in 81 trials were 1,624, 1,747 and 1,185 kg. per ha., respectively. On a dry-matter basis, the average crude oil content (36 trials) and crude protein content (24 trials) of *C. sativa*, white mustard and summer rape were 40.2, 29.3, 38.8 % and 26.1, 31 and 27.7 %, respectively. The average crude oil yields per acre of *C. sativa* and white mustard were 633 and 492 kg. per ha. The systematics and morphology of the genus *Camelina* are described in some detail. The vegetative period of the selection tested is about 100 days from sowing to harvest, about 2 weeks less than that of white mustard or summer rape ; *C. sativa* also appears to be far less subject to insect attack than the other two crops. It is considered that there is some scope for the improvement of *C. sativa* by selection, though the future rôle of this crop in Swedish agriculture will probably be decided by the results of studies now under way on the quality of its oil.—P.J.B.

OTHER CROPS

469 TENNESSEE Agricultural Experiment Station. Bull. No. 214. **Variety performance trials of field crops—corn, oats, wheat, barley, cotton, sorghum, alfalfa, red clover. Data for 1949 with summaries of results from previous years.** By *S. V. McMurray.* 1950, pp. 15.

LAND USE, SURVEYS AND MANAGEMENT

470 NICHOLSON, H. H. **Land drainage.** *Ass. Agric. Rev.* 1950, Pt. 7, 4-9. [School of Agric., Cambridge]

471 PLANT, W. **A survey of mineral deficiencies in crops on arable land in two English counties.** *Emp. J. exp. Agric.* 1950, **18**, 41-8, bibl. 6.

A description is given of a nutritional survey of farm crops to assess deficiencies of nitrogen, phosphate, potash, calcium, manganese, and boron. The nutrient condition of a crop was diagnosed by the use of two complementary methods, (a) 'visual' and (b) 'tissue-tests'. In both counties nitrogen and phosphate deficiency were wide-spread; potash deficiency was confined to potatoes and beans, acidity was observed only in roots, whilst micronutrient deficiencies were confined to sugar-beet (Hereford only). Overall statistics for the counties showed that in Hereford 18 % of the tillage area was deficient in nitrogen, 19 % in phosphate, and 1 % in potash; in Somerset 10 % was deficient in nitrogen, 20 % in phosphate, and 1 % in potash. In general, the results of these surveys suggest that a more rational use of fertilizers would involve the increased use of nitrogen for all crops and of phosphorus for cereal-growing; increased dressings of potash to potatoes; the use of lime only where soil tests show an overriding need, and avoidance of over-liming, which on certain soils induces boron deficiency.—Author's summary.

472 WHITBY, H. **Some changes in the structure of Scottish agriculture since 1870.** *J. Proc. Agric. Econ. Soc.* 1950, **8**, 312-36.

The main changes which have taken place during the period are recounted. The late 1940's saw a return to the cropping pattern of the 1870's, with a relatively high proportion of field crops under tillage. Oats has remained predominant among the cereals, being grown for oatmeal, stock feed and as seed for farmers in England and Wales. Barley comes second, being grown mainly for whiskey making. Wheat gained ground for a short period only in the second world war. Turnips, swedes and potatoes remain the only other important field crops. Sugar beet has been the only new crop of any importance, but only 9000 acres are now grown, and yields are lower than in the south.—C.W.S.H.

473 MIÈGE, E. Les céréales secondaires en Afrique du nord. [**The secondary cereals in North Africa.**] *Rev. Bot. appl.* 1950, **30**, 555-78, bibl. in text.

Information is given on barley growing in Tunisia, Algeria and Morocco with regard to crop area, production, varieties and research. The area under barley in 1933-37 was 3,087,000 ha. against 3,739,000 ha. under wheat. The other cereals, in order of decreasing importance, grown in the three French colonies, are oats, which was not grown before the French occupation and has still a limited importance, rye, millet (*Panicum miliaceum*), and canary grass (*Phalaris canariensis*). The last named species grows wild in north Africa and is grown on 20,000 ha. in Morocco.—E.B.

474 GORDON, E. **A land use map of Kuntaur in the Gambia.** *Geogr. J.* 1950, **116**, 216-7, bibl. 1, map 1.

The types distinguished on the soil map correspond roughly to three topographical divisions of the district: the bush-covered edge of the sandstone pleateau; the alluvial flats bordering the river; and the area between the two, which is the vital area of settlement and of "upland" agriculture. The variety of soil types found has an important effect upon settlement because, while most villages stand on the sandy soils suitable for groundnuts, they are also usually close to swamps where rice can easily be grown. Each village is therefore able to cultivate a cash crop (groundnuts) in addition to rice, and upland food crops (maize and millet). Shifting cultivation is the basis of agriculture, and the light soils of the upland area, after 3 or 4 years cultivation, revert to grass and scrub for two or three seasons. Occasional fallowing is practised nearer the village on the lower lands, where manure is available. Only the rice swamps can be farmed every year.—K.O.

475 FONSECA, V. F. da. A economia agrícola na Chibia. [**Agricultural economy in Chibia (Angola).**] *Agron. Angolana* 1948. No. 1, 82-116. [Received 1951] [Serviços Agric., Provincia Benguela]

A brief history and description of the colony of Chibia, founded in 1855, is followed by a consideration of its agriculture. Detailed costs are given of various forms of cropping.—N.G.S.

476 POURTAUBORDE, J. L'irrigation de la plaine des Béni-Amir Béni-Moussa. [**The irrigation of the Béni-Amir Béni-Moussa plain.**] *Terre marocaine* 1950, **24**, 443-51.

Irrigation works are being carried out in the centre of Morocco over an area of 130 to 150 thousand ha. of good land. Before 1938 this region was semi-desert, because of the lack of water, and was used only for extensive sheep rearing and for growing poor barley crops. The present programme is gradually to establish plantation crops and forest, in the irrigated zone, and also to grow annual food crops and fodders. About 1,000 ha. are at present under lucerne. This programme is being carried out in co-operation with the natives and should be accomplished in 10 years.—E.B.

477 COSTE, R. Esquisse agricole de l'île Maurice. [**An outline of the agriculture of Mauritius.**] *Agron. trop.* 1950, **5**, 366-83.

478 PORTÈRES, R. Nouvelle systématisation des types d'agriculture au travers de la notion du climax de domestication. [**New systematization of agricultural types based on the notion of the domestication climax.**] *Bull. agric. Congo belge* 1949, **40**, 2147-9.

After mentioning previous classifications of cultural systems which were based on some ecological factors, or interventions by man, a new classification is given, divided under three main heads: protocultivation, primitive and evolved systems.—E.B.

FARMING SYSTEMS AND PRACTICES

479 IVERSEN, K., and DORPH-PETERSEN, K. Førsog med staldgødning og kunstgødning på sandjord ved Lundgaard og Tylstrup, 1927-46. [**Trials in manuring with dung and with artificial fertilizers on sandy soil at Lundgaard and Tylstrup (Denmark), 1927-46.**] *Tidsskr. Planteavl* 1949, **53**, 33-84.

The rotation was rye, root crops (swedes or potatoes) oats, and clover-grass. At Lundgaard in 1943-46 lupins were grown instead of clover-grass. A comparison between the use of the same amounts of plant nutrients in dung and artificial fertilizers shows that under the soil conditions in question it has been possible to cultivate the soil without applying dung, and that throughout this 20-year period no deterioration, relative to the dunged crops, has been noted in the crops which received only artificial fertilizers.—R.P.J.

480 COOKE, G. W. **Placement of fertilizers for row crops.** *J. agric. Sci.* 1949, **39**, 359-73, bibl. 14. [Chem. Dept, Rothamsted Expt Sta., Harpenden, Herts.]

Fertilizer placed in contact with the seed damaged the germination of sugar beet, mangolds, swedes and peas in 1947 ; damage was also caused by fertilizer placed directly below the seed. In 1947 and 1948 some damage to the germination of sugar beet was caused by fertilizer in bands 3 in. below the soil surface and 1 in. to the side of the seed; in both years bands of fertilizer 3 in. to the side of the seed were safe. Where placement of medium or full fertilizer dressings is adopted for row crops, the bands should be placed not less than 2 in. from the seed to avoid the risk of injury to germination. All methods of placing gave consistently higher yields of peas than broadcasting fertilizer, the average advantage of placing being over 2 cwt. of peas per acre. In all the experiments on peas in 1948 early applications broadcast and worked deeply into the seed-bed were somewhat superior to late applications made at sowing time.

Yields of sugar beet were reduced by methods of applying fertilizer which reduced the plant population. There was little difference between the mean yields for all experiments given by broadcast fertilizer and fertilizer placed in safe positions near the seed. Placed fertilizer promoted much more vigorous growth of sugar-beet tops than broadcast fertilizer during spring and early summer, but by harvest time this superiority had vanished. Mangolds and sugar beet responded in much the same way to placed fertilizer. In experiments on swedes in 1947, average yields were very low, due to drought during the summer. Fertilizer placed either directly below, or below and to the side of, the seed gave consistently higher yields of swedes than broadcast fertilizer. Placement of fertilizer is of considerable benefit to crops with a short growing season and limited root range, and also to crops made sensitive to nutrient deficiency by the poverty of the soil or the immobilization of nutrients by drought.—From author's summary.

481 AIYER, A. K. Y. N. **Mixed cropping in India.** *Indian J. Agric. Sci.* 1949, **19**, 439-543 + pls. illus.

This issue of the above journal is devoted entirely to consideration of mixed cropping in India, with appendices on the vernacular and common names of the crops, summaries of experimental results, and a list of rotations practised. [It is, in effect, a small book, and a very valuable one at that.] The first part is a general consideration of mixed cropping. Forms of mixed cropping are : mixed permanent crops ; mixed permanent and temporary crops ; green manure crops ; and mixed crops with fodder grasses. It is pointed out that mixed cropping is in no way a substitute for a rotation, and examples are given to support this contention. There are variations in the methods of sowing mixed crops, the crops may be part broadcast, part drilled, all broadcast, all drilled, or transplanted in whole or in part. The effect of growing legumes with non-legumes is discussed ; present knowledge is inconclusive. Consideration is given to mixed cropping and soil moisture relationships. By using both shallow and deep rooting plants, greater advantage can be taken of the plant food resources, in the soil. It is urged that studies of root depths are needed in order to further this, and also to ensure the best utilisation of soil moisture under both irrigated and non-irrigated conditions. An important aspect of mixed cropping is that it provides a form of insurance against vagaries of weather, and attacks by insects and diseases. The introduction of more efficient mechanical means of cultivation, etc. is hindered by the practice of mixed cropping. The system is claimed to be of advantage in obtaining a balanced diet. Economy of space, the maximum utilisation of all available land, and the possibility of raising all requirements from a single plot of land are the considerations underlying the practice. The range of crops used is very wide. In the economics of the system, varying stages of profit, or loss, obtain. The second part of the book is more specific, and deals with the relationship of mixed cropping to some of the principle crops. These are : *Oryza sativa* ; *Andropogon sorghum* ; *Pennisetum typhoideum* ; *Eleusine coracana* ; *Triticum vulgare* ; *Hordeum vulgare* ; *Zea mays* ; *Gossypium* spp ; *Arachis hypogea* ; *Cajanus indicus* ; and *Setaria italica*. Details are given of the various crops with which they are grown in mixture, and of the proportions in which they are sown. [The lists are formidable—for example, in the case of

Cajanus indicus, the reporting States and Provinces give a total of 65 types of mixture.]—N.G.S.

482 LUNAN, M. **Mound cultivation in Ufipa, Tanganyika.** *East Afr. agric. J.* 1950, **16**, 88-9. [Dept. Agric., Tanganyika]

In this primitive method of cultivation, the rotation begins during February to April, when the grass cover is cut and put in small heaps. The sod, cut by hoe, is then piled in circular mounds of upturned divots over the heaps of grass, each mound being 3 ft. in diameter and 2 to 2.5 ft. high. Crops grown on these mounds include beans, cassava sweet potatoes, chick-pea and wheat. These are harvested in June or July, and when the fields are weeded in October the weeds are thrown into heaps. Later, in November, after the rains have begun, the mounds are broken down and spread over the field, and finger millet and maize are then sown on the flat. Cassava may be planted at the base of a mound before it is broken down so that it continues to grow among the millet and maize, until these two are harvested in July. In November small mounds are made to cover heaps of weeds. These are left till January when they are broken down and spread, and the fields are again sown with finger millet, which is harvested in the following June. The field is left in a flat condition until the following December when it is ridged and sown with maize interplanted with groundnuts, beans or Bambarra groundnuts. Occasionally bushes and trees are incorporated in the first mound cultivation and are burnt in the dry season. There is no methodical spreading of the ashes over the field.

Although this system may be conducive to erosion, this could be controlled by joining the mounds by small ridges. The chief merit of this method of mound cultivation is that it incorporates the grass in the soil to rot down to humus, instead of leaving it to be burnt in the annual grass fires. —K.O.

483 TIDSSKRIFT FOR PLANTEAVL. Meddelelser fra Statens Forsøgsvirksomhed i Plantekultur. Forsøg med Pløgning eller Harvning af Roejord. [**Experiments with ploughing and harrowing the ground after root crops.**] *Tidsskr. Planteavl* 1949, **53**, 177-80.

In experiments conducted from 1945 to 1948 on 10 Danish experiment stations it was shown that, in the case of root-crop fields which have been kept clean and free from weeds, ploughing for the subsequent crop, (in these trials frequently a cereal nurse crop for a ley) can be omitted.—R.P.J.

484 MACKENZIE, K. J., and CORMACK, R. M. M. **Subsoiling in relation to agriculture.** *Rhod. agric. J.* 1950, **47**, 394-7. [Dept Conserv. and Extension, Southern Rhodesia]

485 KITCHING, H. W. **Portable sprinkler irrigation systems.** *Agric. Inst. Rev.* 1950, **6**, 19-22, bibl. 4. [Ontario Agric. Coll., Guelph]

Practical recommendations are given for the determination of the volume of water to be applied at each irrigation to pasture, alfalfa and grain crops, the minimum frequency of irrigation under drought conditions and the choice and size of piping and pumping equipment to be used.—P.J.B.

486 SWEDISH Institute of Agricultural Engineering. Medd. 225 Skördetröskningens inverkan på spannmålens kvalitet. [**Influence of combine harvesting on the quality of grains.**] By *M. Berg, L. Ottosson, E. Åberg.* 1949, pp. 52. English summary, pp. 50-2.

The investigation shows that combine-harvested grain possesses good quality only if harvested when the moisture content is lower than 20 %. If combining is done at that stage the quality is as good as it is after harvesting with a binder and drying in the field.—R.P.J.

487 KEEN, B. A. **The effect of mechanical cultivation on soil degradation.** *Bull. agric. Congo belge.* 1949, **40**, pp. 2003-9, bibl. 8. [E. Afr. Agric. For. Res. Organiz.]

488 BARBOSA, I. Alguns aspectos económicos da mecanização da agricultura em Angola. [**Some economic aspects of agricultural mechanization in Angola.**] *Agron. Angolana*, 1950, **3**, 73-93, bibl. 4, French and English summaries, p. 93.

The relative values of hand, animal, and mechanical cultivations in Angola are discussed, and detailed costs given for the cultivation of one ha. of maize. A method is set out for determining whether a tractor is more economical for a given set of circumstances, than an animal. It is concluded that, even when theoretically uneconomical, the use of a tractor may be advantageous because of labour shortage.—N.G.S.

SOIL AND WATER CONSERVATION

489 African Explosives and Chemical Industries, Ltd. **Soil conservation—its practice and limitations.** By *Z. Deenik.* [**n.d.**] pp. 24. illus. [P.O. Box 1122, Johannesburg]

490 Duley, F. L. and others. **Soil conservation problems on sandy land.** *Nebraska Univ. Agric. Expt Sta.* 63rd Ann. Rept. 1950. 1950, pp. 5-7.

On sandy soils with a low nitrogen and lime content in Nebraska, partridge peas (*Chamaecrista fasciculata*) and hairy vetch (*Vicia villosa*) have proved of value in providing crop residues for the prevention of wind erosion, and also as legume crop for rotations on soils where sweet clover will not thrive. Of the two crops, partridge peas have yielded much the greater amount of crop residue. Partidge peas have been grown at Lincoln since 1945 [soil type not specified] in an oats-maize rotation, in which the legume has volunteered consistently in the oat stubbles each year. Maize in this rotation in 1949 yielded 61.6 bu. of seed per acre, compared with 41.7 bu. per acre in a rotation on the same soil type, without partridge peas. On badly eroded land, where partridge peas were grown continuously in an oats-maize rotation since 1945, the seed yield of maize, following oats plus a volunteer crop of partridge peas, was 37 bu. per acre in 1949, compared with 22.5 bu. per acre for maize following an oat crop in which partridge peas were seeded for the first time in 1948, and 7.7 bu. per acre for maize grown in an oats-maize rotation without the legume.—P.J.B.

491 Godfrey, D. D. H. **Soil erosion and soil conservation in the Condobolin District.** *J Soil Cons. Serv. N.S.W.* 1950, **6**, 31-40.

The article describes the various signs and causes of soil erosion. Erosion can be prevented by proper fodder conservation, conservative stocking, timber preservation and planting, providing adequate firebreaks, contour cultivation, and adequate rotations.—K.O.

492 Burvill, G. H. **Windbreaks and shelter belts in relation to soil erosion.** *J. Dep. Agric. W. Aust.* 1950, **27**, 180-4.

493 MacBride, J., and others. **Mechanised land clearing. A survey of four years experience in Tanganyika.** *World Crops* 1951, **3**, 89-94, bibl. 2, illus.

A description is given of the methods employed by the Overseas Food Corporation in the Kongwa and Urabmo regions of Tanganyika. The land utilization system was designed to meet the needs of topography, conservation and soil types. The soil conservation system at Kongwa was developed during clearance and was based upon true contours, which were surveyed and marked out, after tree felling, by a bulldozer mounted with a simple level. The initial lines were set out at 9 ft. vertical intervals. This system had to be modified to variable grade contours to take the natural drinage systems into account. At Urambo, the system consists of variable grade banks discharging into natural drainage lines, or artificial discharge areas known as watermeadows. The vertical interval at Urembo varies from 2½-4½ ft.—N.G.S.

494 Perrin de Brichambaut, G. Merdjas cotières en mises en défens. [**The coastal merdjas should be protected.**] *Terre marocaine* 1950, **24**, 345-8, bibl. 1.

The " merdjas " north of Port-Lyautey, Morocco, which cover an area of about 10,000 ha. flooded by salt water, are in process of being drained with the object of cropping the land as soon as soil condition will allow. The succession of vegetation, which develops as the soil is gradually drained, is briefly described. To encourage the development of this volunteer growth, this region should be protected from grazing.—E.B.

WEEDS AND WEED CONTROL

495 Tidsskrift for Planteavl. Meddelelser fra Statens Forsøgsvirksomhed i Plantekultur. Flyve Havre. [***Avena fatua.***] *Tidsskr. Planteavl* 1949, **53**, 173-6.

Avena fatua occurs in many parts of Denmark and is particularly common in West Lolland and Langeland. Where the weed is present in such large numbers that the weeding of the spring grain crops is impracticable, control is a matter of rotation of crops. Spring-sown cereal crops should not be included in the rotation. Root crops, winter-sown cereals (rye and wheat), stall fodder crops, etc., are suitable. Fallowing with alternate shallow and deep ploughing is probably one of the best ways of reducing the number of weed seeds in the soil, but many lie dormant for one or more years, even though the best cultivation methods have been employed, so that a special rotation must be used for some years. After 4 to 6 years, spring-sown cereals may again be grown. If any *A. fatua* plants subsequently appear they should be removed before they shed their seed. In root crop fields, weeds should be grubbed up in August-September. Chaff from contaminated areas, which always contains seed of *A. fatua*, should be burnt.—R.P.J.

496 QUEENSLAND AGRICULTURAL JOURNAL. **Purple thorn apple and hairy or recurved thorn apple.** *Qd agric. J.* 1950, **71**, 217-20.
The botanical description, distribution in cultivation areas, and properties of these two noxius weeds, *Datura tatula* and *D. metel*, is given. Eradication measures include hand-pulling, 'chipping,' and mowing of the plants before they set seed. 2,4-D sprays are not recommended because they have given variable results. Recent work with 2,4,5-T indicates that one of the *Datura* sp. can be readily killed by spraying with a 0.1 % emulsion of 2,4,5-T at a rate of 140 gal./ac.—K.O.

497 HITCHCOCK, A. E., and others. **Growth and reproduction of water hyacinth and alligator weed and their control by means of 2,4-D** *Contr. Boyce Thompson Inst.* 1950, **16**, 91-130, bibl. 5. [Tulane Univ., New Orleans, La]
Applications of not less than 8 lb. per acre of the amine salt or ester of 2,4-D were effective in controlling water hyacinth (*Eichhornia crassipes*), though a second application of the herbicide was needed to eliminate survivors. At equivalent rates of application, 2,4-D was more effective than 2,4,5-T against *E. crassipes*. Applications in August caused more rapid sinking of this weed than applications in May, June or July. There were no evidences of 2,4-D toxicity in livestock having access to water or *E. crassipes* leaves sprayed with 2,4-D. Applications of not less than 8 lb. of 2.4D or 2,4,5-T ester applied in September or October were effective in controlling alligator weed (*Alternanthera philoxeroides*). For this weed, the time of year appeared to be an important factor in the effectiveness of its control for all the herbicides used, except 2,4,5-T. Sprays delivered at 150 lb. per sq. in. pressure, or less, were more effective than sprays delivered at higher pressures. For helicopter applications, 8 lb. of 2,4-D in 40 % spray concentrations were most effective, followed by ground-operated, 1.25 in. boom-jet sprayers delivering 75 gal. per acre of spray, or less. (See also *Herb. Abstr.* 20 : 557.—P.J.B.

498 SEALE, C. C., and ALLISON, R. V. [**Water**] **Hyacinth** [*Eichhornia crassipes*] **control through the use of 2,4-Dichlorophenoxyacetic acid in different forms and at various rates of application.** *Proc. Soil Sci. Soc. Florida* 1947, **8**, 97-106, bibl. 8. [Received 1951]
[See *Herb. Abstr.* 20 : 557.]

499 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 315. **Weed control in cereals by spraying with selective weed-killers.** 1950, pp. 8.
An account is given of the various weed-killers which can be used as alternatives to sulphuric acid. These include, MCPA, DCPA, copper chloride, and DNOC. Instructions are given on the amount and type of spray solution to be used for the more common weeds, the time of spraying and the precautions to be taken during spraying.—K.O.

500 PANELLA, A. Aspetti pratici della lotta contro le erbe infeste del frumento con diserbanti selettivi. [**Practical aspects of weed control in wheat crops with selective herbicides.**] *Humus, Milan* 1950, **6**, No. 12, 11-2.

501 PETERSEN, H. Ingvard. Forsøg med kemiske midler mod ukrudt i vårsæds- og stubmarker. [**Experiments with chemicals to control weeds in spring sown cereal and stubble fields.**] *Tidsskr. Planteavl* 1950, **53**, 678-708. English summary, pp. 706-8.
Forty-one experiments on weed control in spring-sown cereals were carried out in 1947-48 using copper sulphate, copper chloride, DNOC, and hormone derivatives of the 2,4-D and 4K-2M types. The copper preparations decreased the number of weeds by 40 % but the yield of grain was not increased; DNOC decreased the number of weeds by 55% and increased the yield of grain by 0.7 hkg. per ha.; 2,4-D decreased the number of weeds by 83 % and increased the grain yield by 0.5 hkg. and 4K-2M decreased the number of weeds by 78 % and increased the yield of grain by 1.1 hkg. Of the herbicides tested, the hormone preparations had the greatest herbicidal effect on *Sinapis arvensis*, *Chenopodium album*, *Atriplex patula* and *Sonchus arvensis*, while the copper preparations and DNOC produced the greatest effect on *Polygonum convolvulus*, and DNOC the maximum effect on *Polygonum lapathifoleum*. Where dusting with hormone preparations was undertaken 2 to 6 weeks before sowing the grain, or just after, germination of the grain was often impaired. The herbicidal effect was greatest when the weeds had 4 to 6 leaves. Where the hormone treatment of stubble fields in autumn was undertaken immediately before or after soil cultivation, the herbicide did not affect the crop yields in the following year or the number of weeds present.—R.P.J.

502 Templeman, W. G., and Wright, J. O. **Relative effects of the n-butyl esters of 2-methyl 4-chlorophenoxyactic acid and of 2, 4-dichlorophenoxyacetic acid on cereals.** *Nature, Lond.* 1951, **167**, 71-2. [Imp. Chem. Ind. Ltd, Jealotts Hill Res. Sta., Bracknell, Berks.]

503 Ordanini, P. L'uso dei diserbanti selettivi nella coltura del frumento in provincia di Milano. [**The use of selective herbicides on wheat crops in the province of Milan.**] *Humus, Milan* 1951, **7**, No. 2. 23-7.

504 Terre Marocaine. Le désherbage sélectif des céréales. [**The selective weeding of cereals (in Morocco).**] *Terre marocaine* 1951, **25**, 1-10, bibl. 6. [Rabat, Serv. de la Rech. agron.]

The comparative effect of various selective herbicides and of hand weeding was studied in 1949 in a field of soft wheat where the degree of infestation was about 325 weed plants per sq. m. The herbicides included various products of the 2,4-D type and an ammonium dinitrophenate product called Herbogil. A list is given of the weed species present in the field. The results are summarized as follows : (a) the products of the 2,4-D type acted in a similar way, they destroyed *Chrysanthemum*, *Emex*, *Rumex Raphanus*, *Convolvulus* and the leguminous plants, they damaged *Linaria*, *Fumaria*, and *Silene*, but did not affect the grasses ; (b) Herbogil had a quick action and destroyed approximately the same weeds as did 2,4-D ; (c) with regard to effectiveness of control, hand weeding took first place, followed closely by the 2,4-D products applied by spraying ; the 2,4-D products, applied as dusts, and Herbogil, applied as spray, were less effective ; (d) the average increase in wheat yield from the weeded plots compared to that from non-weeded plots was 3 q./ha. It was found that the germination capacity of wheat from the treated plots was not adversely affected by the herbicides, that weeding by hand and by herbicides increased the specific gravity of the seeds, and that 2,4-D increased the weight per 1000 seeds.—E.B.

505 Shafer, N. E., and Klingman, D. L. **Weed control research. Effect of 2,4-D on weed-free grain crops.** *Nebraska Univ. Agric. Expt Sta.* 63rd. Ann. Rept 1950. 1950, p. 51.

Pawnee wheat was sprayed at the jointing, early boot, late boot and flowering stages of growth, with 2,4-D and 2,4,5-T. In 1948 trials, all rates above 0.5 lb. of 2,4-D ester per acre resulted in significant yield reductions compared with the controls. In 1949, comparable yield reductions were not obtained until rates of 1.5 to 2 lb. per acre of 2,4-D ester, were used. In both 1948 and 1949 trials, the greatest floret sterility and grain yield reductions followed spraying at the early boot stage. The germination of the seed was not affected by any of the times or rates of 2,4-D application used. The reactions of Pawnee wheat to 2,4-D and 2,4,5-T were similar. Nemaha oats were sprayed at the same stages of growth as the Pawnee wheat. All applications of 0.25 lb. or more, of 2,4-D ester per acre, resulted in significant yield reductions compared with the controls, when applied at the jointing stage. Yields were not affected by any of the other rates [not specified], or times of application. Oat yield reductions as a result of 2,4-D spraying were always accompanied by a reduction in the number of fertile florets per culm and in 1000 kernel weight of seed.—P.J.B.

506 Shaw, W. C., and Willard, C. J. **Use of 2,4-D on small grains.** *Ohio Agric. Expt Sta.* Bull. 695. Farm Science and Practice. 68th Ann. Rept. 1949, pp. 75-6.

Exhaustive trials on wheat and oats during 1948 and 1949, in which the crops were treated at 10 growth stages, including pre-emergence, indicated that the safest time to treat either crop was at the stage when it had tillered well, but had not yet reached the jointing stage. The most serious 2,4-D injury was caused by treatment at the growth stages from booting to heading. All 2,4-D treatments of winter wheat in autumn, even as low as 0.25 lb. per acre of 2,4-D acid equivalent per acre, caused severe injury to the crop. [No rates or dates of 2,4-D application are specified.]—P.J.B.

507 Collins, E. V., and Norton, R. A. **Weed control in growing corn.** *Iowa State Coll. Agric. Expt Sta.* Report on Agric. Res. for year ending June 30, 1949, p. 30.

The yield of maize, soyabeans and oats following weed-control treatments, including mechanical cultivation, pre-emergence and post-emergence herbicide spraying and post-emergence flaming, were compared. Marked increases in maize yields of up to 7 bu. per acre [basis of comparison not indicated] followed pre-emergence spraying with 2 lb. of 2,4-D acid per acre. Post-emergence spraying and flame-weeding, in addition to mechanical cultivation, did not significantly raise the maize yields. None of the treatments significantly affected soyabean yields, though results indicated that soyabeans had a higher tolerance to flaming and 2,4-D spraying than was expected. In trials with oats, 21 in. cultivated rows seeded at 1.25 bu. per acre gave approximately the same yield as 7 in. cultivated rows seeded at 2.5 bu. per acre. When mechanical cultivation was omitted, grain yields were markedly reduced. The highest grain yields came from plots seeded in 7 in. rows at 2.5 bu. per acre and treated with pre-emergence sprays of 0.35 lb. 2.4-D per acre.—P.J.B.

508 England and Wales, Ministry of Agriculture and Fisheries. Advisory Leafl. 345. **Weed control in linseed and flax by selective herbicides.** 1949, pp. 4.

509 Plati, J., and Ellern, S. J. **One year's agricultural aviation in Israel.** *World Crops* 1951, **3**, 104-5.

All references are to applications of spray from the air. Major weeds of winter wheat on heavy soils were controlled by 2.4-D and MCPA at the rate of 250-350 g. of 2,4-D equivalent in 4 gal. of water. On sandy soils, *Anthemis* was checked by 500 g. 2.4-D equivalent per acre. Malformation of about 10 % of the ears resulted from spraying a local wheat variety before tillering. Charlock and wild carrot type of weeds on an area of about 1,000 acres were destroyed [spray and rate not specified] and as a result maize could be sown without further cultivations, thus advancing the sowing date by four to six weeks. 2,4-D sprays were also used to control bindweed in summer cereals, to destroy thistles on mountainous slopes, and to check the growth of *Prosopis* spp., which pushes up through the runways on airfields. Maize was dusted with cryocide to control *Heliothis armigera* ; clover and lucerne with DDT to control *Prodenia litura* ; and wheat and barley with BHC to control *Syringopais temperatella*. The special problems of spraying from the air are discussed. Damage to neighbouring crops through drift was less than that that caused by ground spraying equipment.—N.G.S.

510 Meadly, G. R. W. **Recent developments in chemical weed control.** *J. Dep. Agric. W. Aust.* 1950, **27**, 193-8.

511 Tomaselli, R. Applicazione del metodo fitosociologico alla valutazione dell'efficacia dei discerbanti. [**The phytosociological method applied in estimating the effectiveness of herbicides.**] *Humus, Milan* 1951, **7**, No. 1, 23-9.

A wheat field near Pavia, Italy, infested by a weed association with *Vicia hirsuta* and *Artemisia vulgaris* dominant, was treated with Agroxone I.C.I., Erbitox and Weedone applied at 3 different concentrations. The quantity of water employed for each product and each concentration was 5l. per 100 sq. m. The field was divided into plots of 100 sq. m. each on which phytosociological surveys were carried out before and after herbicide treatment. The results of these surveys, which show the frequency of the weeds present in the plots, are tabulated.—E.B.

512 Hamel, A., and Dansereau, P. L'aspect écologique du problème des mauvaises herbes. 2. [**The ecological aspect of the weed problem. 2.**] *Agriculture, Québec* 1948, **5**, 369-79. [Received 1950]

[See *Fld Crop Abstr.* 2, Abs. 86.] In an attempt to classify weeds on an ecological basis, the geographical origin and distribution of the adventitious plants and their specific characters in relation to environment are examined.—E.B.

513 King, L. J., and others. **Herbicidal properties of sodium 2,4-dichlorophenoxyethyl sulphate.** *Contr. Boyce Thompson Inst.* 1950, **16**, 191-207, bibl. 24. [Union Carbide and Carbon Chem. Corp., W. Virginia Lab., S. Charleston]

In tests with a large number of compounds, sodium 2,4-dichlorophenoxyethyl sulphate was relatively non-toxic in aqueous solutions of low concentration when applied directly to the foliage of plants, or to germinating seeds, but was highly herbicidal to germinating seeds when applied to the surface of non-sterile soil in which they were growing, an effect due mainly to biotic action. The lack of injury to foliage following spraying or dusting with this compound was in marked contrast to the injury resulting from similar 2,4-D applications. In greenhouse trials, this new herbicide required a period of between 12 to 30 days to disappear from the soil following applications at the rate of 1 to 10 lb. per acre. In field trials with sweet corn [*Zea mays*], the best control of broad-leaved weeds was obtained following applications of 2 or 3 lb. of sodium 2,4-dichlorophenoxyethyl sulphate on the day of sowing, or four to seven days later. The best crabgrass [*Digitaria* spp.] control was obtained from applications four days after sowing the sweet corn.—From authors'summary.

514 Schönbrunner, J. Selektive Unkrautbekämpfung unter besonderer Berücksichtigung der Hormonderivate. [**Selective weed control with particular reference to hormone derivatives.**] *PflSchBer.* 1950, **4**, 65-83, bibl. 13. [Bundesanstalt für Pflanzenschutz, Wien]

Weed control experiments were made with preparations of hormone derivatives and of dinitro-ortho-cresol applied to cereal fields, pastures, onion fields and waste land. Weeds of different species were widely different in their sensitivity to the hormone preparations and the same plant differed in susceptibility at different stages of its development. Tables are given which show, for several herbicides and several weeds, the concentration of solution, rate of application, number of treatments, stage of development of weed and degree of reaction. In the control of *Chenopodium album*, *Lepidium draba*, *Raphanum raphanistrum* and *Cirsium arvense* in cereal fields, hormone derivatives proved more efficient than dinitro-ortho-cresol. *Sinapis alba* appears to be equally senstive to each type of weed killer.—D.B.

515 Newman, A. S., and Thomas, J. R. **Decomposition of 2,4-dichlorophenoxyacetic acid in soil and liquid media.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 160-4.

516 England and Wales, Ministry of Agriculture and Fisheries. Advisory Leafl. 374. **Precautions in the use of insecticides, fungicides and weed-killers.** 1950, pp. 4.

CROP BOTANY

517 Gossweiler, J. Flora exótica de Angola. [**Exotic flora of Angola.**] *Agron. Angolana.* 1948, 1949, and 1950. **1**, 121-98, **2**, 173-255, and **3**, 142-67. French and English summaries **3**, p. 167.

The common names of economic and cultivated plants are given in alphabetical order, together with their specific names. Brief notes are given on each plant.—N.G.S.

518 Aiyer, A. K. Y. N. **Glossary of vernacular and common names of Indian crops with their botanical names.** *Indian J. agric. Science* 1949, **19**, appendix I, 530-3.

519 United States Department of Agriculture. Circ. No. 857. **Identification of Brassicas by seedling growth or later vegetative stages.** By *A. F. Musil.* 1950, pp. 26.

520 Lund, A. E. [**Bisexual inflorescences in maize.**] [Russian] *Priroda, Moskva* 1950, **39**, 58.

521 Chevalier, A. Sur l'origine des *Digitaria's* cultivés. [**The origin of the cultivated species of *Digitaria*.**] *Rev. Bot. appl.* 1950, **30**, 329-30.

522 Petit, L. Contribution a l'étude du dosage et de la répartition de l'aneurine dans le blé, la farine et le pain. [**Estimation and distribution of aneurin in wheat, flour and bread.**] *Ann. Inst. nat. Rech. agron.* Ser. A. 1950, **1**, 41-107, bibl. 8. [Inst. Nat. Recherche Agron, Paris]

The first part of the paper is purely chemical and deals with methods of estimation of aneurin. The second part examines the formation and distribution of aneurin in the plant during growth and maturation. From germination to fertilization the aneurin content is continuously increasing and the green parts of the plant appear to play an active rôle in its synthesis. At maturation, aneurin accumulates in the scutellum.—D.B.

523 Hirai, K. **On the boron deficiency in plant. II. The external boron deficiency symptoms and boron requirements of Kenaf plants in culture solutions. III. Boron contents in culture solution and growth of Kenaf plants IV. The external boron deficiency symptoms and boron requirements of Japanese barn yard millet. V. Boron requirements of barley.** (V. jointly with T. Akashi.) [In Japanese] *Sci. Bull. Fac. Agric. Kyūshū* 1950, **12**, 55-82, bibl. 11. illus. English summaries, pp. 61, 68, 74, 82.

Dilute concentrations of boron are essential for the growth of *Hibiscus cannabinus* in culture solution. The minimum requirement is 0.025 ppm of boron. Symptoms of boron deficiency are described, the most obvious symptom being the bending of the petiole. For normal growth, a concentration of 0.03 ppm boron is required. For Japanese barnyard millet, the minimum requirement of boron is 0.003 ppm. Deficiency symptoms are given. The minimum requirement of barley is .003 ppm. Where the concentration exceeds 0.05 ppm., barley is injured by excess boron.—N.G.S.

524 Gillis, J., and others. La cuproina come reactivo para la determinacion espectrofotometrica de trazas de cobre en los vegetales. [**Cuproine as a reagent for the spectrophotometric determination of traces of copper in vegetation.**] *Anal. Edaf. Fisiol Vegetal.* 1950, 9, 585-591, bibl. 2. [Univ. Ghent, Belgium]

A colorometric method for determining the smallest traces of copper in vegetation, using the new reagent cuproine (2-2′ diquinolil) is described. The copper-cuproine complex is stable between pH values of 2 to 9, and the coloration obtained lasts for 72 hours.—N.G.S.

525 Pattanaik, S. **The effect of manganese on the catalase activity of rice plants.** *Plant and Soil* 1950, **2**, 418-9, bibl. 3. [Bot. Dept., Ravenshaw Coll., Cuttack, India]

Rice seedlings were grown for 10 weeks in nutrient solutions containing 0, 1, 5, 10, 20, and 50 ppm of Mn. The mature leaves and the growing regions of the roots were then selected for the determination of their enzyme activity. The results showed that the addition of up to 10 ppm of Mn. to the nutrient solution progressively increased enzyme activity in the plants, whilst concentrations above 10 ppm of Mn. progressively decreased this activity.—P.J.B.

526 GERRETSEN, F. C. **Manganese in relation to photosynthesis. II. Redox potentials of illuminated crude chloroplast suspensions.** *Plant and Soil* 1950, **2**, 159-93, bibl. 37.

527 EATON, S. V. **Effects of phosphorus deficiency on growth and metabolism of soybean.** *Bot. Gaz.* 1950, **111**, 426-36, bibl. 18. [Hull. Bot. Lab., Univ. Chicago]

The Manchu III variety of *Glycine soja* was grown in two series of sand culture (a) with complete nutrient and (b) in phosphorus-deficient solution. Plants were given an additional photoperiod to prevent their blooming before they had reached the desired stage of phosphorus deficiency. Leaves of phosphorus-deficient plants were at first deep green in colour, and later chlorotic; they soon died. The plants were small with thin, hard stems which were low in moisture. At all stages they contained more carbohydrates than did the plants with complete nutrient. This accumulation of carbohydrates in the deficient plants is thought to be due to interference with protein synthesis at the amide stage. Of the nitrogen fraction, phosphorus-deficient plants contained more in the soluble form than did the plus-phosphorus plants. The accumulation of soluble nitrogen is also attributed to the interruption of protein synthesis at the amide stage and to proteolysis. All forms of phosphorus were higher in plus- than in minus-phosphorus plants. See also *Fld Crop Abstr.* 3, Abs. 622.—D.B.

528 DROUINEAU, G., and others. Sur l'influence du calcaire sur la nutrition végétale. [**The influence of limestone on plant nutrition.**] *Ann. Inst. nat. Rech. agron.* Ser. A. 1950, **1**, 368-81, bibl. 22. [Stat. d'Agron. et de Biochimie végétale, Antibes]

Sand culture experiments, using maize, peas and dolichos, have shown that potassium nutrition is independent of the concentration of calcium ions in the solution, of variations between pH7 and pH8 or of the presence of large amounts of calcium carbonate in contact with the roots. The experiments have also shown that the potassium content of the aerial parts of the plants is influenced only by the concentration of potassium in the nutritive solution.—D.B.

529 HOPKINS, D. P. **Sodium as a plant nutrient.** *World Crops* 1950, **2**, 333-5, bibl. 5.

530 KONDRUCKAJA, N. V. [**Technique for determination of vitamin C in plant material.**] [Ukrainian] *Bot. Ž.* 1949, **6**, 87-93. bibl. 20. Russian summary, p. 93

Four different methods elaborated by Tillimans, Glick, Derjatnin and Bukin were tested and compared. Bukin's method, in a form simplified by the writer, was selected for the work. In this method the pigments and extraneous reducing substances are removed from the extract by treating it with activated charcoal re-constituted beforehand with sulphuretted hydrogen. The method is suitable for the determination of vitamin C in stained extracts. —R.P.J.

531 VOSKRESENSKAJA, N. P. [**The effect of light of long wavelength on the formation of carbohydrates and proteins in leaves.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 173-6, bibl. 11. [Timirjazev Inst. Pl. Physiol., Acad. Sci., USSR]

Tests were made with *Zea mays*, *Helianthus annuus* and *Phaseolus* sp. to study the effect of red and blue rays on the formation (in leaf segments) of dry matter, of carbohydrates, of synthesied nitrogenous substances, and the role of CO_2 in this synthesis. The accumulation of dry matter and of carbohydrates proceeds intensively under exposure to long wavelengths of the spectrum. Protein synthesis does not take place in the absence of CO_2 in either red or blue rays, but (in the case of maize and sunflower) when photosynthesis is functioning, protein is produced and the intensity of the process is greater in blue rays.—M.H.

532 GUBANOV, G. Ja. [**Disturbance of carbohydrate metabolism under the influence of tannins in cotton attacked by wilt.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **71**, 565-8. [All-Union Cotton Res. Inst.]

Investigations indicate that in the tissues of cotton attacked by wilt (*Verticillium dahliae* and *V. alboatrum*) there is a sharp disturbance of metabolism, particularly of carbohydrate metabolism. In attacked plants there is generally increased activity of amylase, peroxidase, and other ferments. The content of tannin materials is markedly increased in the tissues of diseased plants, and under the influence of these materials the activity of the amylase increases, which causes rapid hydrolysis of starch. A reduction in the activity of amylase in different tissues of the cotton plant under the influence of tannin materials was noted only when a surplus amount of these materials had accumulated in the tissues and the latter had begun to die. A similar phenomenon was noted in plants attacked by wilt and in plants subjected to the influence of a solution of tannin. A surplus amount of tannins apparently directly affected not only the colloids of the protoplasm, but also the ferments. The depressing effect of tannin on the activity of amylase of cotton is manifested also when the tannin is introduced not into the plant but directly into the extract of the ferment obtained from triturated tissues of the plant. By increasing the concentration of tannin in the extract from 0.02 to 0.10 % the action of the ferment was almost completely paralysed.—R.P.J.

533 Loo, S.-W., and Loo, T-L. **Preliminary experiment on reductase in soybean sprouts.** *Bot. Bull. Acad. Sinica* 1949, **3**, 201-2, bibl. 5. [Dept. Botany, Univ. Peking]

534 Sreenivasan, A., and Wandrekar, S. D. **Biosynthesis of Vitamin C during germination. I. Effect of various environmental and cultural factors.** *Proc. Indian Acad. Sci.* Sect. B. 1950, **32**, 143-63, bibl. 30. [Dept Chem. Technol., Univ. Bombay, India]

The legumes studied were *Phaseolus radiatus*, *Cicer arietinum*, *Pisum arvense*, *Lens esculenta* and *Phaseolus aconitifolius*. Treatment with manganese ions had no effect on the formation or distribution of Vitamin C. Treatment with N, P and K fertilizers plant hormones and colchicine inhibited growth and resulted in a marked decrease of Vitamin C formation in the earlier stages of germination. Ultra-violet rays had no significant effect on the synthesis of the vitamin. Cold steeping of seed and germination in the dark, induced increased biosynthesis of Vitamin C, the latter method being more effective. Cold treatment followed by germination in the dark led to greater vitamin formation than germination in the dark alone. The effectiveness of the cold treatment varied with the length of the treatment.—N.G.S.

535 Brewer, H. E., and Butt, J. L. **Hygroscopic equilibrium and viability of naturally and artificially dried blue lupine seeds.** *Plant Physiol.* 1950, **25**, 245-68, bibl. 17. [Alabama Agric. Expt Sta., Auburn]

The extreme variations among comparable lots of blue lupin seeds in loss of viability when stored under similar conditions, and the unexplained decline in germinability of some seed lots when stored under apparently favourable conditions emphasize the need for fundamental research on response of lupin seeds to their environment. The moisture changes resulting from variations in atmospheric humidity were investigated. The hygroscopic equilibrium at different humidities of the air was determined by three methods : saturated solutions of various salts, sulphuric acid solutions, and the electric hygrometer. Results by all three methods were in agreement but the electric hygrometer proved to be the most accurate, convenient and rapid, equilibrium being reached in from 24 to 72 hr., in contrast to 3 to 8 weeks by the solution methods. There was no significant difference between results obtained from seeds naturally cured in the field and those artificially dried with heated air. Seeds of *Lupinus angustifolius* showed consistent losses in viability during storage at the lowest and at the highest experimental humidities. " Germinability declined with both increases and decreases in storage humidity from peak germination counts at about 25% relative humidity for low quality seeds and at 65% relative humidity or higher for seeds of high initial viability. Losses in viability at low storage humidities had no apparent relation to subsequent inability of the seeds to absorb normal amounts of water, since few hard seeds were produced except during prolonged storage at the lowest humidities."—D.B.

536 Britten, E. J. **Natural and induced parthenocarpy in maize and its relation to hormone production by the developing seed.** *Amer. J. Bot.* 1950, **37**, 345-52, bibl. 24. [Univ. Hawaii, Honolulu, T.H.]

Three methods are described for artificially inducing pathenocarpy in *Zea mays* by using 0.1 % naphthalenacetic acid. The first method, spraying the acid on the silks, gave no response. The second, the introduction of the acid into the pith of the cob, by means of a short-stemmed thistle funnel, gave a response confined to the region of insertion. The third and most effective method was the spraying of ovaries which had previously been exposed by removing husks and shortening the silks. The effect was again localized, parthenocarpy being limited to the sprayed ovaries. Naturally occurring parthenocarpic fruits were observed only in ears which also contained normal fruits to which they were invariably adjacent. This spatial relationship indicates that natural parthenocarpy in maize arises from the stimulus of a chemical produced by the developing fruit. Observations on artificially-induced parthenocarpy support the view that the growth substance responsible travels towards the apex rather than down stem. Growth of treated ovaries was much more rapid than growth of fertilized ovaries and was accompanied by enlargement of nucellus and pericarp due not to mitosis but to cell expansion. Naturally- and artificially-induced parthenocarpic fruits were strikingly similar in structure.—D.B.

537 Lal, K. N., and Subra Rao, M. S. **A rapid method for estimation of leaf area in growing maize plants.** *Curr. Sci.* 1950, **19**, 179-80, bibl. 1. [Plant Physiol. Lab., Coll. Agric., Benares Hindu Univ.]

The leaf factor $K = \frac{\text{length} \times \text{breadth}}{\text{area}}$. The average value of K is determined for a sample of 25-30 leaves of different ages. The total width [ΣB] and total length [ΣL] of all the leaves of the plant are estimated. These values are then used with the formula $\text{Log } \Sigma A + \text{Log } \Sigma L + \text{Log } \Sigma B - \text{Log } K - \text{Log } N$. (where N is the number of leaves), giving the total leaf surface to within 6.6. %. The value K was found to be between 1.18 — 1.54 with an average of 1.32, the method of arriving at this figure being set out in tabulated form. It is claimed that the entire estimation takes less than ten minutes.—N.G.S.

538 Thomson, Betty F. **The effect of light on the rate of development of *Avena* seedlings.** *Amer. J. Bot.* 1950, **37**, 284-91, bibl. 9. [Connecticut College, New London]

Observations on the rate of production of leaf primordia by the stem apex and on the course of growth of internodes, coleoptiles and leaves are recorded graphically and in tables. The results support the hypothesis, advanced in this paper, that the basic effect of light is to accelerate growth and that the differences in the net response of plant parts to light are due to differences in the sensitivity of the various organs in various phases of their growth. Previous literature on this subject supports this hypothesis.—D.B.

539 Novikov, V. A., and Filippov, A. V. [**Critical period regarding light intensity in spring wheat.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 405-8, bibl. 17. [Leningrad Agric. Inst.]

The sensitiveness of cereals to deficient light intensity does not coincide with the light phase in plant development, but occurs after the completion of this stage. A study has been made of the onset (in four spring wheat varieties) of the need for increased light intensity, the duration of this period of need, its variation with the different wheat types, and the extent to which conditions prevailing during growth determine sensitivity to insufficient light intensity. It is concluded that the most sensitive phase to deficient light (as also to insufficient soil moisture) is the period during which the sexual cells are being formed. [See also *Herb. Abstr.* 9. Abs. 1478 and 1479.]—M.H.

540 Čaĭlahjan, M. H. [**The role of roots in the photoperiodic reaction of plants.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 201-4, bibl. 5.

The physiological condition of its leaves plays a significant role in photoperiodism of the plant. Not only leaf assimilates, but also the substances derived from roots may be involved, and the question therefore has arisen whether the root, as such, has any influence on the plant's photoperiodic reaction. Experiments were made with *Perilla nankinensis* (a typical short-day species), *Rudbeckia bicolor* (a long-day species), and *Brassica crenata* (a long-day species, with specific reactions to short day). The plants were grown under two variants, involving the following culture conditions: with roots in nutrient solution; with roots in water; growing in water without roots; and in nutrient solution without roots. There is evidence that the photoperiodic reaction of both *Perilla* and *B. crenata* is independent of root influence, but in *Rudbeckia* there is a connexion between root activity and photoperiodic reaction of the plant. It is concluded that, in this type of long-day plant, nutrients from roots as well as from leaves are necessary for passing through the developmental phases.—M.H.

541 Beljdenkova, A. F. [**The light stage of development in plants, and their limits of geographical distribution.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **71**, 761-4, bibl. 3. [Komarov Bot. Inst., Acad. Sci. USSR]

This subject has been studied with species of *Papaver*, *Melandrium*, *Hyssopum*, *Campanula*, *Abutilon* and *Hibiscus*. Records have been made of their range of distribution (latitudes), the daylength in which the plants pass through the light stage of their development under natural conditions, and the number of days they require, under different daylengths varying from 10 to 16 hours, for the transition from sprouting to flowering. There is an indication that daylength, equally with other factors, has a determining influence on plant distribution.—M.H.

542 Poruckiĭ, G. V. [**The vernalizing activity of low temperatures.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **67**, 577-80, bibl. 19. [Inst. Pl. Physiol. and Agrochem., Acad. Sci., Uk. SSR]

The study was made with three wheat varieties which differed in their winter hardiness, namely, Odesskaja No. 3, Ukrainka, and Kooperatorka. The effect of low temperatures (—6°C., —4°,0°, and +2°) on plant characteristics is recorded in a table, An increase in the formation of reserve tillering nodes and the strengthening of pericycle activity under the lower temperatures (—6°, —4°) enable the plants to withstand adverse winter conditions —M.H.

543 Molotkovskiĭ, G. H., and Molotkovskiĭ, Ju. G. [**The influence of some conditions of the outer medium on ear formation in branched spikes of rye.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 401-4, bibl. 9. [Černovick State Univ.]

A study has been made of some factors which affect the degree of branching in winter rye spikes. There are indications that, under experimental conditions (1) the absence of nitrogen in the nutrient medium tends to inhibit branching of the ears; (2) vernalized seed from 4-rowed ears, sown in summer (10th June) produced plants with spikes showing 48 % branching, while seed of the same origin, winter sown, produced plants with 26 % branching in the spikes; (3) when rye sown in autumn was transplanted (beginning of April) at the tillering phase, the spikes showed 43 % branching, compared with 24 % in the control.—M.H.

544 Brown, J. W., and Weintraus, R. L. **A leaf-repression method for evaluation of formative activity of plant growth regulating chemicals.** *Bot. Gaz.* 1950, 111, 448-56, bibl 12. [Camp Detrick, Frederik, Md]

A technique for measuring quantitatively a formative effect of exogenous chemical growth-regulators is described. The method, which is based on the repression of leaf development subsequent to application of growth-regulator to the bud, exhibits a rather high degree of sensitively and reproducibility. A number of uses are discussed.—Authors' summary.

545 Alekseev, V. A. [**Influence of the water regime on production of auxins and growth of plants.**] [Russian] *Doklady Akad. Nauk SSSR.* 1949, **67**, 561-4, bibl. 9. [Kazan State Univ.]

546 Mackov, F. F., and Podpažanskaja, B. S. [**Heteroauxin as a micro-fertilizer.**] [Russian] *Doklady Akad. Nauk SSSR* 1949, **66**, 973-5. [Kharkov Agric. Inst.]

Results of experiments with oats and sugar beet are reported which furnish a basis for considering heteroauxin to be a peculiar micro-fertilizer, appearing as a specific organic micro-nutrient of plants and so making good the deficiency and increasing the effectiveness of purely mineral fertilizers.—R.P.J.

547 Salonen, M. Tutkimuksia viljelyskasvien juurten sijainnista Suomen maalajeissa. [**Root investigations of field crops in Finnish soils.**] *Suom. Maataloust. Seur. Julk.*, 1949, **70**, 7-91. English summary pp. 87-91.

548 Goedewaagen, M. A. J. De methoden, die aan het landbouwproefstation en bodemkundig Instituut T.N.O. te Groningen bij het wortelonderzoek op bouw-en grassland in gebruik zijn. [**The methods in use at the Agricultural Experiment Station and Soil Science Institute at Groningen for root investigations on arable land and grassland.**] 1948, pp. 11.

The paper describes two techniques for taking root samples from soils. The first method involves the use of a hand borer for obtaining determinations of the root content of soils. In the second method a nailed board is used on which a block of soil is impaled, the soil being then washed away leaving the roots, in their original distribution pattern, on the board.—P.J.B.

549 Sandström, B. **The ion absorption of roots lacking epidermis.** *Physiol. Plantarum* 1950, **3**, 496-505, bibl. 5.

550 Williams, D. E., and Coleman, N. T. **Cation exchange properties of plant root surfaces.** *Plant and Soil* 1950, **2**, 243-256-bibl. 8.

551 Torrey, J. G. **The induction of lateral roots by indoleacetic acid and root decapitation.** *Amer. J. Bot.* 1950, **37**, 257-64, bibl. 13. [Univ. Calif., Berkeley, Calif.]

It is postulated that an unidentified substance other than auxin is necessary for lateral root formation in pea roots, but that the substance becomes active within the root under the influence of auxin. A balance between naturally produced auxin within the root and the lateral root-forming substance is suggested as the mechanism controlling normal lateral root formation in the intact plant. —From author's summary.

552 Åberg, B. **On auxin antagonists and synergists in root growth.** *Physiol. Plantarum* 1950, **3**, 447-61, bibl. 29. [Plant Physiol. Inst., Royal Agric. Coll., Uppsala, Sweden]

A study of the effect of a number of compounds, including indole-3-acetic acid, naphthalene acetic acid, 2.4-D and 2,3-triiodobenzoic acid on the root growth of flax plants.—P.J.B.

553 Hopkins, H. T. and others. **Growth and nutrient accumulation as controlled by oxygen supply to plant roots.** *Plant Physiol.* 1950, **25**, 193-209, bibl. 26. [Plant Ind. Sta., Beltsville, Md]

Biloxi soyabean, *Glycine max*, was one of the plants studied. " Attention was focused on the overall growth response of several plants to low oxygen partial pressures ambient to the roots. Experimental conditions were established such that diffusion of oxygen to the root surfaces would not be a limiting factor. Nutrition and water supply were maintained at optimum levels for the plants studied. Changes in cell elongation, green weight, and ion accumulation, and shifts in the internal nutritional status of the shoot were observed. Growth was followed in experiments of 2-weeks' duration while periods of 2 or 3 days were used in studying uptake of radioactive isotopes." Root growth was stopped by reducing the oxygen content of the gas surrounding the root to 0.5 %, but at this level, top growth and accumulation of ions continued.—D.B.

554 Almestrand, A. **Studies on the growth of isolated roots of barley and oats.** *Physiol. Plantarum* 1949, **2**, 372-87, bibl. 23. [Bot. Lab., Lund Univ. Sweden]

Excised barley and oat roots were cultivated on a variety of sterile liquid media and media containing vitamins and growth substances. It was found impossible to obtain unlimited growth of the roots, such increases in length as were observed being due to the elongation of the meristematic cells existing at the time of excision. The investigations showed that the cessation of growth does not depend on temperature or light conditions, inorganic nutrients or the large number of organic substances and growth regulating compounds used. It is concluded that the factor responsible for inducing further cell division is an unknown substance formed in the leaves. Experiments carried out to isolate this substance have so far been unsuccessful, but further work is in progress.—P.J.B.

555 KANDLER, O. Zur Frage einer endogenen Wachstumsrhythmik bei *in vitro* kultivierten Maiswurzeln. [**Endogenous growth rhythm in cultures of maize roots.**] *Biol. Zbl.* 1951, **70**, 64-70, bibl. 16. [Univ. Munich]

Isolated roots of *Zea mays* were cultivated in test tubes under constant temperature and light intensity. Growth in length was measured, using a horizontal microscope, at intervals of 2-3 hours. In rapidly-growing roots there were periodic fluctuations in rate of growth. Since the length of the periods was unrelated to time of day or other external influence it is concluded that the rhythm originated in the plant itself and was attributable to rhythmical processes of a physical nature. See also *Herb. Abstr.* 19, Abs. 574.—D.B.

556 NAYLOR, A. W., and RAPPAPORT, Barbara N. **Studies on the growth factor requirements of pea roots.** *Physiol. Plantarum* 1950 **3**, 315-33, bibl. 35. [Osborn Bot. Lab., Yale Univ., New Haven, Conn.]

A study of the differential response and growth of the excised roots of three varieties of pea in substrates containing organic and inorganic sources of nitrogen, indole acetic acid, and diffusates of coconut milk and banana.—P.J.B.

557 ASANA, R. D., and others. **Some observations on the influence of 2,4-Dichlorophenoxyacetic acid (2,4-D) on the growth and development of two varieties of wheat.** *Physiol. Plantarum* 1950, **3**, 334-52, bibl. 19. [Bot. Div., Indian Agric. Res. Inst., New Delhi]

Two Indian wheat varieties, NP 165, an early *vulgare* type, and S 40, a late *durum* type, were used in studies of the effect of the sodium salt of 2,4-D on the growth, development and nutrition of wheat during its complete life-cycle. The plants were grown in soil cultures in earthenware pots with a concentration of 1 ppm of 2,4-D in the soil and in water cultures containing a concentration of 0.25 ppm of 2,4-D. A dissection of the water-cultured plants at 6 weeks after sowing showed that the final number of leaves on the main shoot of NP 165 (about 9) had already been laid down and was but little affected by the 2,4-D. The 2,4-D had a significantly depressing effect, however, on the tiller differentiation of this variety the average number of tillers being 6.4 in the untreated controls and 2.8 for the 2,4-D treated plants. At between 42 and 72 days after sowing, various morphological deformities became apparent in the 2,4-D treated NP 165 plants, though no such deformities were apparent in S 40 grown under similar conditions. Since tiller differentiation was reduced by 2,4-D to a relatively greater extent than nitrogen uptake, it was surmised that 2,4-D had a direct effect on the meristematic activity of the plants. The soil-cultured plants of both varieties followed approximately the same growth pattern as the water-cultured plants. The 2,4-D had no effect on the time of onset of the reproductive phase and ear emergence of either variety. S 40, a drought-resistant variety, was markedly less affected by the 2,4-D than NP 165 in all the trials. It is suggested that if it is possible to confirm the apparent correlation between 2,4-D resistance and drought resistance in wheat, the effects of 2,4-D treatment might prove a useful index for the comparison of the drought resistance of varieties.—P.J.B.

558 HASMAN, M., and BURSTRÖM, H. **The action of 6-amino-undecane on wheat seedlings.** *Physiol. Plantarum* 1950, **3**, 361-9, bibl. 8.

559 MOORE, R. M. **Differential effects of certain phenoxyacetic acid compounds and phenylcarbamates on plant species. 2. Effects of foliage applications with special reference to yields of wheat.** *Aust. J. agric. Res.* 1950, **1**, 401-12, bibl. 9, pls. 3. [Div. Plant Industr., C.S.I.R.O., Canberra]

The effects of foliage sprays of various phenoxyacetic acid derivatives and of isopropyl *n*-phenylcarbamate on a dicotyledon, *Phaseolus vulgaris*, were compared. The carbamate was without effect and although all phenoxyacetic acid compounds were markedly toxic, they differed in the rapidity of their action. Wheat (*Triticum vulgare*) exhibited differential responses to phenoxyacetic acid compounds and to isopropyl phenylcarbamate at different growth stages. Applications of four phenoxyacetic acid compounds to wheat at different stages of development, from late seedling to flowering, showed that grain yields were reduced most markedly by applications in the seedling stage; the butyl ester and amine salt of 2,4-dichlorophenoxyacetic acid were more toxic than the sodium salt. Foliage sprays of isopropyl phenylcarbamate 0.1 %, had no effect on wheat in the late seedling or tillering stages, but severely depressed the yield of grain when applied at flowering. Barley (*Hordeum vulgare*) responded similarly. Higher concentrations applied to wheat at pre-shooting reduced grain yields. Flax (*Linum usitatissimum*), although susceptible to pre-emergence treatment, was not affected by foliage sprays of isopropyl phenylcarbamate at any growth-stage. Applications of 0.1 % 2,4-dichlorophenoxyacetic acid as the sodium salt reduced flax yields only when applied at the seedling stage.—From author's summary.

560 Helgeson, E. A., and Konzak, R. **Phytotoxic effects of aqueous extracts of field bindweed and of Canada thistle—a preliminary report.** *North Dakota Agric. Expt Sta. Bimonthly Bulletin.* 1950. **12**, 71-102.

Extracts of *Cirsium arvense* and *Convolvulus arvensis* were made by leaching the dried and ground tissues of these plants for 20 minutes in water in the proportions of 20, 30 and 40 parts water to one part plant tissue. Germination counts and growing point measurements of flax and wheat seeds were taken 4 days after being placed on filter papers impregnated with the weed extracts. At the 1 : 20 *C. arvense* and *C. arvensis* extract concentrations, flax and wheat seedling roots were inhibited to 24 % and 42 %, 21 % and 48 % of the length of control roots, respectively. Increases in the concentration of the weed extracts progressively reduced seed germination and the seedling root and shoot growth of wheat and flax. *C. arvensis* tops and *C. arvense* roots caused a greater inhibition of seedling growth than *C. arvensis* roots and *C. arvense* tops.—P.J.B.

561 Naundorf, G. Substancias inhibidoras vegetales. [**Inhibitory substances in plants.**] *Notas agron., Colombia* 1950, **3**, pp. 1-61, English summary, p. 43, bibl. 343. [Palmira Agric. Expt Sta.]

This review of recent research deals with inhibition of germination; inhibition of growth; inhibition of intracellular metabolism; substances antagonist to auxins and inhibitory substances derived from auxins; hormones with correlative inhibitory action; antibiotic and antimicrobic substances; relation between inhibition and stimulation; importance of inhibitory substances in plant ecology and sociology. The inhibitory substances are classified. The plants which provided the material for research are listed.—E.B.

562 Geisler, Erika. Einige Beobachtungen über den Einfluss des Hexachlorcyclohexans auf die Pflanze. [**The influence of hexachlorbenzene on the plant.**] *NachrBl. dtsch. PflSchDienst Braunchschweig* 1950, **2**, 131-5. [Pflzanzenschutzamt, Frankfurt a. M.]

The observations were made on wheat, rye, oats, barley and yellow mustard. Overdoses of hexachlorbenzene (70 kg. per ha.) inhibited plant growth, length more so than bulk. The germination process was unaffected, the inhibition first occurring when the radicle had developed sufficiently to absorb water and salts as an independent organ. In the plants studied the degree of inhibition was specific to the genus. Experiments using *Drosophila* showed that plants which absorbed hexachlorbenzene themselves became insecticidal. The gamma isomer of the chemical is the most effective insecticide and can therefore be used in lower concentrations than can the other isomers. Lower concentrations promote, rather than inhibit, growth.—D.B.

563 von Denffer, D., and Gründler, M. Über wuchsstoffinduzierte Blühhemmung bei Langtagpflanzen. [**Inhibition of flowering in long-day plants induced by growth substance.**] *Biol. Zbl.* 1950, **69**, 272-82, bibl. 5. [Univ. Göttingen, Germany]

MISCELLANEOUS

564 Brooks, F. T. **Research in agriculture.** *Univ. Quart.* 1950, pp. 7.

565 Portères, R. La recherche agronomique dans les pays chauds. [**Agronomic research in the tropics.**] *Rev. Bot. appl.* 1950, **30**, 241-63.

566 Pearsall, W. H. **The investigation of wet soils and its agricultural implications.** *Emp. J. exp. Agric.* 1950, **18**, 289-98, bibl. 14.

567 Palleroni, N. J. Utilización de cámaras de negativo pequeño para la obtención de fotografías de objetos cercanos y fotomicrografías. [**The use of miniature cameras in taking photographs of close and photomicrographic objects.**] *Rev. Fac. Ciencias Agrarias. Cuyo.* 1950, 1, 51-60 + i. illus. English summary p. 60.

568 Jolly, A. L. **The use of clip-cards in agricultural research.** *Trop. Agriculture, Trin.* 1950, **27**, 108-22, illus., bibl. 9. [ICTA, Trinidad, B.W.I.]

This abstract is reproduced in *Herbage Abstracts*. Some applications of a manual card sorting system are considered. The advantage of the manual over the mechanical system is chiefly one of costs.

These cards have been used in the Economics Department of the College for the past 10 years. Their application to field experiments and peasant surveys is described.

The findings from the system are discussed. The chief of these is that the apparent disadvantages appear to the uninitiated much greater than they actually prove to be, and the advantages much less obvious than they are in practice.—From author's summary.

569 WAGENINGEN, Netherlands. Vier en twintigste beschrijvende rassenlijst voor landbouwgewassen. [**Twenty-fourth descriptive list of field crop varieties 1949.**] 1948, pp. 258. English commentary, pp. 19

570 VIRGINIA Agricultural Experiment Station. Bull. 432. **1949 Varietal tests. High crop yield with adapted varieties.** By *E. Shulkcum* and others. 1950, p. 32.

Data are given of varietal tests of maize hybrids, barley, oats, wheat, soyabeans and groundnuts. Brief notes are given of the varieties of each crop recommended for Virginia.—P.J.B.

571 MUNSELL, Hazel E., and others. **Composition of food plants of Central America. I. Honduras, II and III. Guatemala, IV. El Salvador, V. Nicaragua, VI. Costa Rica, VII. Honduras. and VIII. Guatemala.** *Food Research* 1949-50, **14**, 144-64, bibl. 9. **15**, 16-33, bibl. 2. 34-52, 263-96, bibl. 1. 355-65, 379-404, 421-38, and 439-53, bibl. 1. [Nutritional Biochemistry Labs, Cambridge, Mass] [Received 1951]

An investigation into the nutritive value of the edible plants of Central America is being carried out by the Nutritional Biochemistry Laboratories, Massachusetts. The composition of various food plants from Honduras, Guatemala, El Salvador, Nicaragua and Costa Rica, are set out in tabular form, brief notes on each plant being given. Analyses are given for the following amongst others: *Vigna unguiculata*, *Cajanus cajan*, *Inga* spp. *Phaseolus limensis*, *Ph. vulgaris*, *Canavalia ensiformis*, *Zea mays*, *Pisum sativum*, *Vicia faba*, *Phaseolus coccineus*, *Oryza sativa*, *Cicer arietinum*, *Lens culinaris*, *Glycine max*, *Dioscorea alata*, *Manihot esculenta*, *Inga preussii*, *Inga paterno*, *Inga leptoloba*, *Sorghum vulgare*, *Arachis hypogaea*, and *Dolichos lablab*.—N.G.S.

572 UNITED STATES Department of Agriculture. Misc. Pub. No. 325. **Grain grading primer.** By *W. B. Combs*, and *F. G. Smith*. [First issued Nov., 1938] 1953, pp. 67.

A revised edition of the 1938 Primer. It includes revisions of soyabean grades and a new section on the grading procedure for each type of grain. A number of farm practices that lower the quality and grade of grain are briefly discussed.—P.J.B.

573 ENGLAND AND WALES, Ministry of Agriculture and Fisheries, Advisory Leafl. 368. **The care of farm-stored grain.** 1950, p. 7.

574 NILSSON-LEISSNER, G. Statens centrala frökontrollanstalts särskilda föreskrifter angående statsplombering med kontrollodlingsbevis av utsädesvara utav olika jordbruksväxter med undantag för potatis. [**The Swedish Seed Testing Station's special regulations concerning the official sealing of the seed of various agricultural plants, except potatoes, with certification of their cultivation under controlled conditions.**] *Medd. Fronkontrollanst., Stockh.* 1950, No. 25, 59-64.

575 SOUTHERN RHODESIA Department of Agriculture. Mem. No. 2. [revised 2nd. edit.] **A descriptive list of plant diseases in Southern Rhodesia and list of bacteria and fungi.** By *J. C. F. Hopkins*. 1950, pp. 106.

The list also includes brief notes on the best control measures against each disease. A short list of the common and generic names of some of the host plants is given. This abstract also appears in *Herb. Abstr.*—K.O.

576 MIDDLETON, J. T., and others. **Injury to herbaceous plants by smog or air-pollution.** *Plant Dis. Rep.* 1950, **34**, 245-52, bibl. 2. [Mimeographed] [Calif. Univ., Citrus Expt Sta., Riverside, Calif.]

A preliminary report is given of the nature of the plant damage resulting from air pollution in the southern central basin of south California. At least three types of "smog" (smoke + fog), or air pollutions, occur in the affected area: gases, aerosols and particulate matter, the gaseous type being the most common and widely distributed. The symptoms caused by these three types of air-pollution in crop species are briefly described. A table gives the relative susceptibility of a number of crops, mainly horticultural, to injury caused by the gaseous type of air-pollutant. Among the moderately susceptible crops are barley, oats, turnips, alfalfa and sugar beet.—P.J.B.

577 JOURNAL OF THE DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA. **The climbing cutworm moth in South Australia.** *J. Dep. Agric. S. Aust.* 1950, **54**, 184-9, bibl. 7.

The crops in S. Australia most subject to damage by caterpillars of *Heliothis armigera* include linseed, peas, beans and other legumes. Cultural methods of controlling the moth and caterpillar of this pest include cultivation of previously infested land so that over-wintering pupae are killed by exposure, or are buried, so preventing emergence of the moths. The control of various flowering weeds which serve as food for *Heliothis* also reduces moth-damage to cultivated crops. The most valuable insecticide is DDT. This can be applied by power dusters or sprayers, from the ground or from the air. An effective application is 1 lb. DDT per ac. i.e. 15 to 20 lb. of 5 % dust, or 2 lb. per ac. of 5% wettable powder. It is emphasized that DDT should be used only when the numbers of caterpillars justify it, remembering that the insecticide may kill many beneficial insects, including the natural enemies of *Heliothis*.—K.O.

578 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 109. **Flea beetles.** 1950, pp. 4.

The two beetles described are the lesser striped flea beetle (*Phyllotreta undulata*) and the mangold flea beetle (*Chaetocnema concinna*). Cultural and chemical control measures are described. The insecticides described include DDT, BHC, nicotine and derris or *Lonchocarpus* dusts and DDT sprays. —K.O.

579 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. Advisory Leafl. 199. **Wireworms.** 1950, pp. 6.

580 PRIMOST, Edith. Weitere Untersuchungen über den Einfluss von DDT auf Wurzelentwicklung, Keimfähigkeit und Treibkraft einiger Kulturpflanzen. [**Further experiments on the influence of DDT on root development, germinating capacity and sprouting of some cultivated plants.**] *PflSchBer.* 1950, **4**, 150-64, bibl. 9. [Hochsch. Bodenkultur, Wien]

When DDT was mixed with the soil in concentrations of 0.02 and 0.05 % by weight of soil, neither rape nor kohlrabi were retarded in growth. In the storage of cereals, a 10 % DDT powder at a concentration of 1 per 1000 had no detrimental action on germination of the grain, but when applied at twice this rate germination, sprouting and root development were retarded. Only barley remained unaffected by DDT.—From author's summary.

REVIEWS AND REPORTS

REVIEWS

581 PIRES, D. R. V. Estação de melhoramento de plantas de Angola. Plano dos trablhos. [**Plant Improvement Station, Angola. Plan of work.**] *Agron, Angolana* 1948. No. 1, 5-20. [Received 1951].

This review includes information on the improvement of self-fertilized and cross-fertilized cereals, as well as forage crops. Studies are being made of adaptation and multiplication. Fallowing, rotations, spacing, dates of sowing, depth of cultivations, and manurial practices are also under investigation. Diagrams show the layout of the various experiments.—N.G.S.

582 BELGIUM, Institut National Etude Agronomique Congo Belge. Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. [**Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes.**] Vol. 1. Bruxelles : Vromant, S.A., 3, Rue de la Chapelle, 1948. 25 × 16, pp. 446, 41 figs, 12 pls. [Received 1951]

This is the first volume of the Flora of the Belgian Congo and Ruanda-Urundi which is being prepared at the State Botanical Garden of Brussels under the supervision of an Executive Committee presided over by W. Robyns. The flora of the spermatophytes will be the first part of the work and it will alone include about 20 volumes. This first volume deals with the gymnosperms and 18 families of dicotyledonous angiosperms. [This review is reproduced in *Herbage Abstracts*.]—E. Biasutti.

583 NOYEN, J. Possibilités d'augmentation des rendements des principales cultures indigènes au Lomami. [**Possibility of increasing the yield of the principal indigenous crops at Lomami (Belgium Congo).**] *Bull. agric. Congo belge* 1949, **40**, 2253-6.

The activities of the experiment station at Gandajika (annual rainfall 1,360 mm.) are described. When *Centrosema plumieri* was grown on fallow land and ploughed under before cotton, the seed-cotton yield was 229 kg/ha. By replacing *Centrosema* with *Calopogonium mucunoides* the seed-cotton yield increased to 460 kg/ha. Since 1946, a trial under cassava and *Pennisetum purpureum* in which the plants were periodically cut to increase organic matter gave an average seed-cotton yield of 660 kg./ha. Fallow under *Pennisetum* should receive nitrogen manuring.—E.B.

584 OXLEY, T. A. **The scientific principles of grain storage.** 22 × 14. pp. 103. Liverpool : The Northern Publishing Co. Ltd. 1948, 8s. 6d.

This little book is quite admirable in so far as it goes. The reservation is due to the fact that few directions are given for the practical application of the information it contains. It is more of a dissertation upon the problems of grain storage, and a description of certain methods of evaluation, e.g., measurement of temperature, carbon dioxide, etc.

A section is devoted to insect and mite pests, their descriptions and life histories, but no methods of control are given other than the employment of hygienic methods of storage. The book is thorough within its coverage, and provides a valuable textbook and reference. It is to be hoped, however, that a subsequent volume will continue where this has left off, and expound the practical applications of the theories herein described.—N. G. Shreeve.

585 Wallace, H. A., and Bressman, E. N. **Corn and corn growing.** [5th edition revised by J. J. Newlin, E. Anderson and E. N. Bressman] 21 × 14. pp. 431. New York: John Wiley and Sons, Inc., 1949. London: Chapman and Hall, Ltd., 1949. $4.50. 64 figs.

The fifth edition is completely revised. New material is provided on the history of maize. The sections on maize growing, on the application of fertilizers, and on chemical methods of weed and pest control have been aligned with modern practices. The chapter on maize statistics has been brought up to date.—N. G. Shreeve.

586 Demerec, M. (Editor). **Advances in Genetics, Vol. III.** Academic Press Inc., New York 1950: 45s.: pp. 267: figs: tables: plates.

This volume contains a collection of papers on diverse genetical investigations. Each paper has an excellent bibliography and there is a useful index Since the emphasis throughout is on plant breeding, readers are referred to Plant Breeding Abstracts for more details. Of interest to readers of this journal is a paper by F. D. Richey of the United States Department of Agriculture, Knoxville, Tennessee, entitled *Corn Breeding*. This reviews methods of maize breeding, the genetics of the characters concerned, and discussed different theories put forward to account for the phenomenon of hybrid vigor. (Abridged from Plant Breeding Abstracts).

587 Crescini, F. Piante erbacee di grande coltura. [**Field crops of large-scale cultivation.**] *Roma*: *R.E.D.A.* 1946, 25 × 18, pp. 519, figs. 324, tables 31, bibl. in text, 24s. [Received 1950.]

This book is based on a two-years' course of lectures on field crops given by the author since 1935 at the Universities of Bologna and Turin. The crops, covered in 6 chapters, are, cereals, grain legumes, fibres, tubers, roots and oil seeds. The world-wide aspect of these crops is dealt with, particular consideration being given to those grown in Italy. The information given in respect of each crop includes reference to its origin, geographical area of cultivation, botany, husbandry, seeds and uses. There are indexes of species, crops, and authors; as well as a summary of contents. The book has good illustrations and is generally well produced.—E. Biasutti.

REPORTS

The notes below under Reports indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

588 **London**. British Commonwealth Scientific Official Conference. Specialist conference in agriculture. **Plant and animal nutrition in relation to soil and climatic factors. Australia 1949. Report of conference.** London, 1950, pp. 21.

Among the papers presented were the following:

(1) Meteorological aspects of soil and crop evaporation, by C. H. B. Priestly.
(2) The influence of rainfall on the yield of wheat in South Australia, by E. A. Cornish.
(3) Tillage in relation to soil conditions and plant growth, by B. A. Keen.
(4) Factors determining the amount and availability of plant foods in soils, by J. A. Prescott and C. S. Piper.
(5) Availability of copper, manganese and zinc in soils, by G. W. Leeper.
(6) Influence of microbial activities and organic constituents on nutrition of plants and animals, by R. J. Swaby.
(7) The bacterial equilibrium in soil in relation to plants, by A. G. Lochhead. Presented by Dr. P. S. Nutman.
(8) Boron deficiency in plants, by H. O. Askew. Presented by Dr. J. Melville.
(9) Manganese and copper deficiencies in the south coastal region of South Africa, by I. S. Perold.
(10) The uptake of copper and molybdenum by plants, by C. S. Piper and R. S. Beckwith.
(11) Plant nutrition problems from an Australian viewpoint, by D. S. Riceman.
(12) Enzymes and enzyme systems relating to plant growth and nutrition, by J. Bonner.
(13) The influence of climatic factors on mineral and vitamin content of plants, by K. Hamner.
(14) Influence of light and temperature on nutrient uptake and use with particular reference to zinc, by H. M. Ferres.
(15) Investigations of the soil fertility problem in the wheat lands of South Australia, by K. Woodroffe.
(16) Yield trends in the wheat belt of South Australia during 1896-1941, by E. A. Cornish.

(17) Crop yield trends of long-term field investigations concerning the maintenance of soil fertility of six types of Victorian wheat soils, by H. J. Sims and R. Jardine.
(18) Effects on Victorian soils of various crop rotation systems with particular reference to changes in nitrogen and organic matter under cereal cultivation, by F. Penman.—C.W.S.H.

589 **England.** Rothamsted Experimental Station, Harpenden. Report for 1949. St. Albans, 1950, pp. 178, 5s.

INVESTIGATIONS REPORTED:

(1) Effect of fertilizer placement on sugar beet, mangolds and threshed peas. Fertilizer applied in bands 3 in. below the soil surface and 1 in. to the side of the seed reduced germination. Bands 3 in. to the side were safe. With sugar beet and mangolds there was no advantage in placing the fertilizer, except as far as costs were concerned; broadcasting produced similar yields. With threshed peas, however, higher yields were obtained by placing phosphate-potash fertilizer than by broadcasting it. pp. 33-4.
(2) Radio-active tracers. Preliminary investigations were carried out. Differences were found between the speed and extent of isotopic exchange of coarsely and finely crystallized material. p. 34.
(3) Uptake of sugar and mineral nutrients by leaves. The uptake of sucrose sprayed on tomato leaves under high temperature and low light intensities, as reported from America, was confirmed. With sugar beet, NPK in the leaves was increased by 15 to 40 % by daily spraying with complete nutrient solution. pp. 48-9.
(4) Water relations in the germination of wheat. Experiments in which seeds were held close to the surface of salt solutions of known vapour pressures indicated that there was a well defined critical moisture potential below which seeds of wheat were unable to germinate. Rate of germination was also reduced by reducing the moisture potential, but some seeds germinated against a potential as low as -300 metres of water. It was concluded that, if there is a critical moisture potential, it must be much lower than first experiments suggested. p. 49.
(5) Comparison of the susceptibility to "grey speck" disease, caused by Mn deficiency, of two species of wild oats and two varieties of cultivated oat. *A. ludoviciana* was most affected and *A. fatua* was least affected by varying Mn supply. The effect of Mn supply on dry weight at harvest did not differ greatly in the two cultivated varieties Star and Scotch potato but Mn deficiency caused more severe leaf symptoms and greater delay in ear production in Star. p. 50.
(6) Seed dormancy of wild oat species. Dormancy in *Avena sativa* was due to impermeability of the seed-coat to oxygen, but with *A. ludoviciana* there was, in addition, dormancy due to factors in the embryo and endosperm. p. 50-1.
(7) Field experiments. Experiments with a total of 2010 plots are reported at Rothamsted and Woburn on grain crops, roots, hay and grazing. p. 93.
(8) Ley arable experiment. pp. 93-4.
(9) The yield of spring-sown cereals. p. 94-5.
(10) Effect of variety and seed-rate on spring-sown beans. pp. 96-7.
(11) Effect on a linseed crop of drilling and broadcasting PK fertilizer. With heavy dressings (6 cwt/ac.) drilling the fertilizer reduced yields. p. 96.
(12) Effect of irrigation and N manuring on sugar beet. It was shown that in a very dry year 6 in. of irrigation water was sufficient for a full crop, though a completely disease-free crop might use more. High N dressings depressed the yield of sugar, and at one centre the presence of N reduced the benefit of irrigation water. pp. 98-101.
(13) Effect of salt and muriate of potash on sugar beet. Salt and potash were applied to sugar beet in a 2-course rotation with barley. On half the plots the salt was applied at half rates to the barley, as well as at full rates to the sugar beet. Salt up to 2.5 cwt. per acre increased yields over an 8-year period and the effectiveness of the dressings continued over the whole period. There was a response to potash only in the absence of salt. Neither the salt nor the residual potash had any marked affect on the barley. pp. 101-4.
(14) Survey of marginal land. A random sample of farms (100 in number) was taken in the Welsh region of marginal land; cropping and stocking records were taken and suggestions for improvement were recorded at each visit. Similar surveys are to be undertaken in northern and south-western England. pp. 55.—C.W.S.H.

590 **Empire Cotton Growing Corporation,** Progress reports from Experiment Stations: Season 1948-9. Programmes for 1949-50. pp. 172 + v. London, 1950.

The work of the Experiment Stations in Africa, Australia and the West Indies is reported. The

New Central Research Station at Namulonge in Uganda was opened during the year.

INVESTIGATIONS REPORTED:

South Africa, Barberton.

(1) Varieties. The hybrid A.2106 gave a lint yield significantly higher than all other varieties. (pp. 13-6).

(2) Verticillium wilt. End of season removal of debris reduced wilt in the following season; various manurial treatments had no effect on its incidence; varieties D.181 and BP. 52 show the highest resistance, and M.U. 8A maintains its yield despite its susceptibility. (pp. 17-21).

(3) Bacterial blight. (*Bacterium malvacearum*). Spray inoculation failed as a means for detecting resistant and susceptible types. (pp. 21-5).

(4) Effect of rainfall on yield. Significant positive correlations were found between cotton yield and the rainfall before sowing. (pp. 27-8).

Uganda, Kawanda.

(5) Effect of rainfall on yield. There were positive correlations between yield and rainfall in February, July and October, but a negative correlation with August rainfall. (pp. 34-7).

(6) Resistance of cotton to Blackarm. (pp. 39-44).

(7) Breeding. Variability studies have shown that there is sufficient variability in B.P. 52 stock to make selection worth while. (pp. 44-50).

(8) Optimum sowing date for S.W. Buganda. The middle of June was shown to be the optimum date. (p. 50).

Anglo-Egyptian Sudan, Gezira, Shàmbat, Kadugli.

(9) Breeding for disease resistance. Both blackarm- and leafcurl-resistant strains have been bred, but these will probably be replaced by BLR. 14/16 which has proved resistant to both diseases. (pp. 54-61, 62-7).

(10) Effect of sowing date and spacing. Early planting in July, close spacing and three plants per hill gave the highest yield (pp. 72-4).

Tanganyika, Lake and Eastern Provinces.

(11) The effect of different methods of land resting between crops. Five years after the 3-year resting period the residual effects of different treatments in that period were still apparent in the yield of bulrush millet, used as the indicator crop. Resting in elephant grass (*Pennisetum purpureum*) still gave a 33 % higher yield of millet than continuous bulrush millet cropping during the resting period. In a trial with cotton as the indicator crop, resting land under a grazed grass fallow with *Tephrosia* and *Crotalaria* gave a higher yield of cotton in the first year than continuous bulrush millet cropping. Where the bulrush millet was manured with 3 tons compost, or 300 lb. superphosphate, yields were higher than from the grass fallow. Natural regeneration during the resting period (with grazing) decreased the yield of cotton by 14 % compared with continuous bulrush millet cropping. (pp. 82-4).

(12) Residual effects of manuring. Fourth year residual effect of manuring with 7 tons farmyard manure was a 36 % increase in cotton yield. (pp. 86-7).

(13) NPK and compost manuring. In the first year significant responses were obtained from superphosphate and compost, but not from sulphate of ammonia or potash. (pp. 85-6).

(14) Effect of tie-ridging. With cotton, sorghum and millet, large increases in yields resulted from building good tied ridges. (pp. 87-8).

(15) Variety trials. In trials on three soil types several varieties gave higher yields than the standard MZ. 561, but the order of yield was not the same on all soils. (pp. 88-90).

(16) Control of the American bollworm. (*Heliothis armigera*). DDT and gammexane dust reduced damage considerably. (p. 95).

Southern Rhodesia, Gatooma.

(17) Variety trials. Strain 12204 gave a higher yield and ginning percentage than 9L34, the variety in commercial cultivation. (pp. 111-2).

Nigeria, Northern and Western Provinces.

(18) Effect of nitrogen and phosphate. Small responses to sulphate of ammonia were not significant, but 50 lb. per ac. superphosphate increased yields by 69 %. In a phosphate experiment superphosphate powder [sic.] at 77 lb./ac. gave a greater yield increase than triple superphosphate pellets at 35.5 lb/ac. (pp. 124-6).

(19) Bollworm control. A survey indicated that a close-season in the northern belt would have a controlling effect on *Diparopsis*, *Earias* and *Platyedra*. (pp. 126-135).

(20) *Helopeltis* control. DDT in 5 % suspension was effective. (p. 137).

West Indies, Antigua.

(21) NPK fertilizer experiments. There were no responses to N or K but P_2O_5 at the rate of 250 lb. superphosphate per acre gave a 21 % increase in seed-cotton yield. (pp. 143-4).

(22) Time of application of nitrogen. Sulphate of ammonia applied 2 weeks and 8 weeks after planting had no effect, but when applied 5 weeks after planting a signifi-

cant increase in yield was obtained. (pp. 144-5).

(23) Effect of pen manure and equivalent NPK dressing. Small applications of pen manure (2 to 4 tons per ac.) gave satisfactory yield increases and were more effective than artificials containing equivalent amounts of N. P. and K. (pp. 145-6).

(24) Effects of various rotations on cotton yields. In an elephant-grass rotation, methods of cultivation for cotton were compared. Cultivation in April (after taking the last grass cut) followed by a bare fallow gave a higher yield than either April cultivation followed by maize or cultivation in June or August. In another experiment green-manure and bare fallow gave higher cotton yields than weed fallow or maize. (pp. 146-9).

West Indies, Montserrat.

(25) Effect of nitrogenous and phosphate manuring. Over a 3-year period on fresh ash soil 200 lb./ac. ammonium sulphate increased cotton yields. On brown earth and shoal soil there were responses to both N and P, while on alluvium N depressed yields. (pp. 154-7).

West Indies, St. Vincent.

(26) Breeding. A number of VH.8 progenies have shown the desired greater yarn strength and it is expected that a hybrid better than the standard V.135 in this respect will soon be available. In a combined varietal and manurial trial VH. 8 gave a 24 % greater lint yield than commercial V. 135. (pp. 158-60).

(27) NPK manurial experiment. There were no significant responses from P, but K gave positive responses up to 150 lb./ac. muriate of potash. Sulphate of ammonia applications were 300, 600 and 900 lb./ac., since positive responses from 300 lb./ac. had been obtained in earlier experiments. The higher rates, however, depressed yields, except in the presence of high potash applications. (pp. 160-4).

Queensland, Biloela.

(28) Mechanical harvesting. The Rust mechanical harvester picked 0.85 ac. per hour, giving less stained lint than found in hand-picked cotton. Ginning percentage was 34.4 against 33.2 for hand-picked cotton. The yield from machine picking varied from 78 % to 97 % of the yield from hand-picking, depending on the variety. (pp. 167-8).

(29) Effect of time and rate of spray irrigation on cotton. The best results were obtained by applying 3 in. in the third week of November. (pp. 168-9).

(30) Varietal and rotation experiment. The varieties Miller 610 and 41S and New Mexico Acala gave the highest yields. The cotton was rotated with irrigated and non-irrigated sorghum and Rhodes grass (*Chloris gayana*). (p. 169).

(31) Control of *Heliothis armigera*. The application of 0.4 % DDT spray resulted in a significantly higher seed-cotton yield from the first picking. (p. 171).—C.W.S.H.

591 **Australia.** Council for Scientific and Industrial Research. Twenty-second Annual Report, for the year ended 30th June, 1948. pp. 141. Canberra, 1948. [Received 1949]

INVESTIGATIONS REPORTED :

(1) Weed control. Experiments have been carried out on the control of *Lepidium draba* (hoary cress), *Chondrilla juncea* (skeleton weed), *Cyperus rotundus* (nutgrass), *Xanthium spinosum* (Bathurst burr), *Bassia birchii* (galvanized burr), *Rubus fruticosus* (blackberry), *Loranthus* spp. (mistletoe), and *Salvia reflexa* (mintweed) pp. 14-5).

(2) Control of take-all disease of wheat. p. 16.

(3) The effect of underlying sand-drifts on water usage in the Murrumbidgee rice irrigation area. p. 45.

(4) Factors affecting fibre quality in flax. p. 104.—C.W.S.H.

592 **Australia.** Commonwealth Scientific and Industrial Research Organization. First Annual Report, for year ended 30th June, 1949, pp. 137. Canberra, 1949. [Received 1950]

INVESTIGATIONS REPORTED :

(1) Weed control investigations. pp. 19-20.

(2) An investigation of yield trends in wheat in South Australia. p. 28.

(3) Effect of seeding methods, time of harvesting and fertilizers on quantity and quality of flax fibre. p. 82.—C.W.S.H.

593 **West Australia.** Journal of the Department of Agriculture. Kimberley Research Station Progress Report, 1947-49. *J. Dep. Agric. W. Aust.* 1950, **27**, 199-209.

The immediate objectives of the research are to determine whether the soils are satisfactory for irrigation and whether a stable system of agriculture can be developed to provide a sound basis for the settlement of the area.

INVESTIGATIONS REPORTED :

(1) Although satisfactory rice yields have not been obtained, the environment is considered suitable for further experiments.

(2) Comparison of cotton yields from irrigated and non-irrigated crops has shown that only the irrigated crops are worth growing. The varieties Locket 140 and Miller Lot 1 have produced cotton of fair to good commercial quality.
(3) Experiments with grain sorghum show the need for irrigation. The best yielding sorghum varieties were Caprock, Kalo, Wheatland and Hegari.
(4) Groundnuts have been successfully established under both dry and irrigated conditions. Large increases in yield of nuts were obtained where potash and phosphate fertilizers were applied in combination. The variety Red Spanish proved more susceptible than Virginia Bunch to grasshopper damage.
(5) The cowpea variety Q 33 Reeve has proved promising, though susceptible to grasshopper attacks.—K.O.

594 **Queensland** Department of Agriculture and Stock. Annual Report for the year 1948-9. pp. 99. Brisbane, 1949. illus.

INVESTIGATIONS REPORTED:
(1) Irrigation trials with cotton. p. 16.
(2) The effect of groundnuts on the subsequent maize crop. p. 22.
(3) The effect of different phosphate manures and of potash on the yield of groundnuts. p. 22.
(4) A spacing trial with maize. p. 25.
(5) The effect on two cotton selections of different spacings and planting dates. p. 25.
(6) Trials with a cotton picking machine. p. 16 and 25.
(7) Variety trials with wheat, oats, sorghum, linseed, cotton, sunflower, velvet beans, maize and rice. pp. 14, 15, 16, 17, 23, 24, 25, 26.—C.W.S.H.

595 **Queensland** Department of Agriculture and Stock. Annual Report for the year 1949-50. pp. 99. Brisbane, 1950. illus.

INVESTIGATIONS REPORTED:
(1) Variety trials with wheat, oats, sunflower, linseed, sorghum, cotton, soyabeans and rice. pp. 13, 14, 15, 16, 19, 20, 21, 22.
(2) The effect of irrigation depths and times of watering on the yield of cotton. p. 15.
(3) The effect of machine picking on fibre staining and lint percentage of cotton. p. 15.
(4) The effect of nitrogen and phosphate fertilizers on yield and grain mottling of wheat. p. 19.
(5) The effect of previous groundnut crops and cover crops on the yield of maize. p. 20.
(6) The effect of NPK fertilizers on maize grown on forest and scrub soils. p. 20.
(7) The response of linseed to phosphate. p. 21.
(8) A planting date and seeding rate experiment with linseed. p. 21.
(9) The effect of minor elements on wheat mottling. p. 38.
(10) The effect of molybdenum on bean yield. p. 38.—C.W.S.H.

596 **South Australia.** Report of the Waite Agricultural Research Institute 1943/1947. Adilaide, 1950, pp. 109.

INVESTIGATIONS REPORTED:
(1) Permanent rotation experiment. The 4-course rotation of wheat/oats/pasture/fallow has continued to produce higher yields of wheat, oats and pasture than all rotations of shorter duration. p. 6.
(3) Forage crops and temporary pasture in 4-course rotations with wheat. pp. 7-8.
(3) Rotation and fertilizer experiment. Results of trials are tabulated. pp. 8-10.
(4) Residual value of superphosphate. The diminution in the response of wheat to current superphosphate dressings as the soil phosphorus status is improved is illustrated in tabular form. pp. 10-11.
(5) Time and rate of sowing field peas. Seed rate varied with time of sowing. With mid-season and late sowing, heavier seed rates improved yields. p. 11.
(6) New varieties of wheat, barley, oats, peas, linseed, and safflower, adapted to South Australian conditions. pp. 11-15.
(7) Effect of mineral deficiencies on plants, particularly Zn, Cu, Mn and Mo. pp. 29-30.
(8) Availability of phosphates to cereal crops. (See *Herb. Abstr.* 14, Abs. 1801. pp. 31-33.
(9) Metabolic changes in plants resulting from infection by viruses. pp. 33-36. [See *Herb. Abstr.* 20, Abs. 416.]
(10) Growth studies on the safflower plant (*Carthamus tinctorius*). pp. 37-38.
(11) Growth promoting and regulating substances in plants. Experiments in progress. p. 38.
(12) Insect pests of stored wheat. pp. 39-41.
(13) Takeall disease of wheat (*Ophiobolus graminis*). pp. 46-47. See also *Herb. Abstr.* 15, Abs. 844 and *Fld Crop Abstr.* 3, Abs. 1058.—K.O.

597 **India.** Council of Agricultural Research. Annual Report for 1948-9. Delhi, 1950.

INVESTIGATIONS REPORTED:
(1) Rice trials. Russian varieties matured six weeks earlier than local types in Kashmir. Chinese varieties continued to yield well.

Organo-mercury compounds, like Ceresan and Agrosan, at a rate of 1 grain per lb. of seed, completely controlled foot-rot disease [specific name not given]. The rice vernalization research scheme at Calcutta University indicates that vernalization stimulates increased sugar production, total nitrogen absorption, and protein synthesis. pp. 6-8.

(2) Wheat and barley trials. pp. 8-10.
(3) Maize trials. p. 10.
(4) Soyabean trials. The optimum sowing date in Ludhiana is between 25th June and 1st July. pp. 10-11.
(5) Mixed cropping. At Madras, best results were obtained from *Cajanus indicus* and runner type groundnut. p. 11.
(6) Physiology of pulses. p. 12.
(7) Lesser millet trials. *Andropogon sorghum*, *Pennisetum typhoideum*, and *Eleusine coracana*. p. 12-13.
(8) Agricultural meteorology. pp. 21-2.—N.G.S.

598 **India.** Central Rice Research Station, Cuttack. Annual Report 1948-9. Cuttack, 1950. pp. 44.

INVESTIGATIONS REPORTED :

(1) Variety trials, pp. 5-9. See Abs. 375.
(2) Manurial trials, pp. 9-14.
(3) Cultural trials. pp. 14-15. Summer ploughing of the lighter type of soil was found to be beneficial, giving over 10 % increase in yields. On heavier soils, summer ploughing was shown to have no advantage over summer fallow.
(4) Spacing trial. pp. 15-16. Optimum spacing for the varieties T. 812 and T. 1242, under the conditions of the experimental farm, lay between 6 and 9 ins.
(5) Double Transplanting, pp. 16-17. At intervals of 30 days, this was found better than a single transplanting of 60-day-old seedlings.
(6) Statistics. pp. 17-21. Experimental plots 4 ft. × 4 ft. were found to have the maximum efficiency. Efficiency decreased with increase in size.
(7) Seed treatments, p. 27. See Abs. 377.
(8) Pest control. pp. 28-35. See Abs. 385.
(9) District trials. pp. 35-8. These were to demonstrate to cultivators the benefits of transplanting and manuring the paddy crop, and of the superiority of line sowing where it was not possible to transplant. But no significance was observed in the latter series of trials, although line sown paddy appeared to respond more to fertilizers.
(10) Double cropping trials. pp. 38-40. See Abs. 370.
(11) Maximum potential experiment. p. 40. This was set up to see how far yields can be improved by adopting all the improvements recommended by the Agricultural Department. Cultivation accounts are being kept.
(12) Weed Control. p. 14. See Abs. 378.
(13) Programme of work for 1949-50. pp. 42-3. This is set out under the general heads : Botany, Agronomy, Statistics, Chemistry, Mycology, and Entomology.—N.G.S.

599 **India.** Institute of Plant Industry, Indore. Progress Report for the year ending 31st May, 1949. Indore, 1950. pp. 64. [Received 1951]

INVESTIGATIONS REPORTED :

(1) Cotton variety trials. pp. 6-9 and 55. See Abs. 450.
(2) Cotton spacing trials. Cotton seed from the widest spaced crop (18 in.) gave better yields and heavier seed. p. 11.
(3) Cotton manuring trials, pp. 11, 12.
(4) Heat treatment of cotton seed. Seed was kept with 60 % moisture at approx. 32°C for 5, 10, and 15 days. Treatment for 10 and 15 days adversely affected the stand of the subsequent crops, p. 11.
(5) Effect on cotton of preceding manured legumes. p. 13.
(6) Long-term manurial and rotational trial. Yield of cotton was greater after groundnut than after sorghum. The effect of nitrogen was significant. pp. 15-16.
(7) Soaking of cotton seed in nutrient solutions. p. 16.
(8) Pest control. The semi-looper caterpillar, *Cosmophila erosa*, was controlled in Indore 2 cotton by the appearance of parasites, mainly a tachnid fly. p. 17.
(9) Programme of work on cotton for the year 1949-50. pp. 22-23.
(10) Sorghum variety trials. Variety IPI 13 proved best of those tried. pp. 24-25.
(11) "Tuer" variety trials. [specific name not given.] p. 25.
(12) Groundnut variety trial. AH 477 proved the best of the varieties tried. p. 25.
(13) Wheat variety trial. pp. 25-6.
(14) Linseed variety trial, p. 26.
(15) *Cicer arietinum* variety trial, pp. 26-7.
(16) Sorghum seed rate and manurial trial. A seed rate of 10-15 lbs. per acre gives higher fodder yields, without affecting grain yields, than 10 lbs. per acre followed by thinning. pp. 27-8.
(17) Manurial trial on kharif and rabi crops. pp. 28-9.
(18) Seed rates, spacings and manurial trial with wheat. Highest yields of unirrigated

wheat, at spacings of 9 and 14 ins. were had from seed rates of 40 and 60 lb. per acre. Seed rates (varying from 40-120 lb. acre) had no significant effect upon the yield of irrigated wheat. pp. 29-30.
(19) Green manuring of wheat. p. 30.
(20) Date of sowing wheat. Highest yield was obtained from wheat sown on the earliest date, 30th October, p. 30.
(21) Erosion control by strip cropping. p. 32.
(22) Rotational and manurial trial. p. 33.
(23) Soaking of seed in nutrient solutions. Treatment increased yields of wheat and linseed, but not of gram. pp. 33-4.
(24) Weed control on waste land. 1-5 % Agroxone dust was ineffective ; 0.1 % liquid Agroxone killed *Xanthium strumarium* and *Eupatorium* within a few days. A concentration of 0.5 % liquid Agroxone was required to kill *Alysicarpus* and *Sesbania* : *Cassia* and the grasses were not affected, even at higher strengths. p. 34.
(25) Pest control. Fumigation with Cyanogas proved effective against rats and white-ants. p. 34.
(26) Programme of work for 1949-50 for crops other than cotton. p. 36.
(27) Statistics. pp. 37-42.
(28) Extension trials with kharif and rabi crops. pp. 43-7.
(29) Costings of crops grown in demonstration units. Costs are given for rice, groundnuts, unirrigated wheat after groundnuts, cotton, wheat, and sorghum (mixed with *Phaseolus radiatus* and "Tuer"). pp. 51-4. —N.G.S.

600 **India.** Central Cotton Committee. Review of work done by the Committee in 1948-9. *Ind. Cott. Grow. Rev.* 1950, **4**, 178-82.

INVESTIGATIONS REPORTED :
(1) Plant breeding. The best of the varieties tried in different places were as follows : at Madhya Pradesh, M5A and 0394 ; in North Gujerat, Kalyan ; in Khandesh, strain 197-3 and Laxmi (Seg. 9-3) ; at Surat, hybrid derivative 68-5-8-2 ; in Madras, 881 F. and 336B ; in the Chinapathi area, 881F and 197-3 ; for the Tungabhadra project, MA-II ; at Nandyal, Co4B-15 ; at Indore, Malvi 9. Other promising strains and varieties at these and other places are reviewed.
(2) Optimum sowing date for American upland cottons at Indore was from 1st-20th June.
(3) Optimum spacing for American upland cottons at Indore was 9 × 8 inches.
(4) Effect of fertilizers on differently spaced cottons.
(5) Effect of trace elements on American cotton.
(6) Control of red leaf disease.—N.G.S.

601 **Malaya.** Mechanization. Quarterly Progress Report, July-September, 1950. *Malay. agric. J.* 1950, **33**, 225-29, Kuala Lumpur, 1950.

INVESTIGATIONS REPORTED :
(1) Rice transplanter trials, pp. 226-7.
(2) Rice dusting trials, pp. 227-8.
(3) Wet padi cultivation. p. 229.—N.G.S.

602 **Malaya.** Notes on current investigations. *Malay agric. J.* 1950, **33**, 230-35, Kuala Lumpur, 1950.

INVESTIGATIONS REPORTED :
(1) Padi trials, p. 230.
(2) Soyabean trials, p. 232.
(3) Fibre crop trials. These include jute, *Hibiscus sabdariffa* and *H. macrophyllus*. pp. 232-3. —N.G.S.

603 **Sarawak** Department of Agriculture. Annual Report for 1949, pp. 74. bibl. 21 [on p. 48 and 74]. [Received 1951]

604 **Mauritius** Department of Agriculture. Twentieth Annual Report of the Sugarcane Research Station 1949. Port Louis, 1950. pp. 56.

INVESTIGATIONS REPORTED :
(1) Weed control, pp. 35-9. Aqueous solution of sodium chlorate at 10 % concentration gave control of : *Barleria prionitis* ; *Tribulus terrestris* ; *Tithonia diversifolia* ; *Axonopus affinis* ; and *Dactyloctenium aegyptium* (between flowering and seeding : it is not known whether sprayed seeds retain their viability). At a concentration of 15%, sodium chlorate solution gave good control of *Cynodon dactylon* at Richelieu Tobacco Research Station. No effective means for controlling *Solanum auriculatum* are yet known.
(2) Hormone weed killers, pp. 39-40. Fernoxone, Raphone and Agroxone gave equal control of *Hydrocotyle bonariensis*. There were no differences between Fernoxone and Agroxone in controlling *Ambrosia artemisifolia* and *Lantana camara*, but Fernoxone was markedly superior to Agroxone in controlling *Solanum indicum*.
(3) Interplanting foodcrops with sugar cane. pp. 44-7.
(4) Linseed trials, pp. 47-9. Linseed is suitable for cool climates in Mauritius, as at Hermitage, if there is no heavy rainfall. No significant differences resulted from drilling seed 6, 8 and 10 in. apart. The variety Punjab grows well in the area, and has a

higher oil content than the local variety. The oil content of Royal is still higher.
(5) NPK trials, pp. 49-51. Oats and rice responded to the complete fertilizer treatment, the result being significant in the case of rice. Oats gave a very high response to phosphate; rice responded better to potash.
(6) Groundnut fertilizer trial. p. 51.
(7) Sorghum. p. 51. The best varieties were Turkey No. 19, Bonita, Midland, Plainsman. and D. D. Sooner.—N.G.S.

605 **Basutoland.** Annual Report of the Department of Agriculture for the year 1949. Maseru. pp. 36.

The year was a poor one. The varieties Ceres and Talberg gave the best yields in the spring-sown mountain wheat trials.—N.G.S.

606 **Northern Rhodesia** Department of Agriculture. Annual Report for the year 1949. Lusaka, 1950, pp. 19.

INVESTIGATIONS REPORTED:

(1) Groundnuts. The trials initiated in 1947/48 were continued at some sites in the Province to test the belief that groundnuts planted on the same land for 2 consecutive seasons failed in the 2nd year. Results were inconclusive. p. 7.
(2) Maize. In a comparative trial between Double Hybrid maize and Hickory King at Chalimbana, the former gave the greater yield, despite drought. p. 15. Potchefstroom Pearl maize out-yielded Hickory King at Lunzuwa. p. 17.
(3) Wheat. The varieties Karachi and Mentana, still under trial, showed promise under Chalimbana conditions. Punjab 8A, is still recommended for rust-free areas. Matopo and selected Red Klein Corn were promising, p. 15. At Lunzuwa, of the wheat varieties tested, Kruger Bearded was the highest yielder; white Klein, Australia, Punjab and Balovale were the best of other varieties tested. p. 17.
(4) Finger millet (*Eleusine coracana*). Yields indicated that this crop needs Chitemene cultivation for successful growth, p. 17. [Chitemene is a native agricultural system practised in N. Rhodesia in which the boughs lopped from trees over an extensive area are piled on a much smaller area and then burnt, finger millet being sown in the ashes at the onset of the rains, without any cultivation of the land.]
(5) Oats. Trials indicated that to avoid yellow rust, white oats should be grown under irrigation in the dry season. p. 17.
(6) Kaffir corn. Plots at Nsombo on acid soils previously dressed with 2000 lb. lime per ac. gave higher yields than on unlimed soil. p. 17.
(7) Cowpeas. For these, land ploughed in July was superior to that ploughed in November; for groundnuts the reverse was true. p. 17.
(8) Rotation trials. These included tobacco, groundnuts, maize and grass. The trials are still in progress. p. 18.—K.O.

607 **Southern Rhodesia.** Summary of Annual Report of the Chief Agriculturist for the year ended 31st December, 1949. By D. E. McLoughlin. *Rhod. agric. J.* 1950, **47**, 352-5.

INVESTIGATIONS REPORTED:

(1) Effect of growing legumes for green manure prior to planting maize. Velvet beans gave better results as green manure than a late-sown crop of sunn hemp. p. 353.
(2) Comparison of protein and oil yield of soyabean and groundnut varieties. The ground nuts produced more protein and four times the quantity of oil. p. 353.
(3) Of four, dwarf, early-maturing varieties of sunflower under trial, Mars provided the heaviest yield of seed, but had a lower oil-percentage than Pole Star, Southern Cross, and Jupiter. p. 353.—K.O.

608 **Nyasaland Protectorate.** Annual report of the Department of Agriculture for the year 1948. Pt. 2. Experimental work. Zomba, pp. 15, n.d. [Received 1951]

INVESTIGATIONS REPORTED:

Tung Experimental Station, Cholo.

(1) Comparison of inter-cropping tung trees during four rainy seasons with soyabeans, maize, velvet beans, and *Calapogonium mucunoides*. Plots under soyabeans on all occasions gave highest yields of tung. p. 5.
(2) Comparison of intercropping tung trees with the following:—(a) Soyabeans, (b) a rotation of maize/groundnut/maize and beans, (c) permanent cover-crops of *Glycine javanica*, (d) no intercropping and little cultivation. p. 6.

Lisasadzi Tobacco Station, Kasungu.

(3) Trials of maize, sorghum, groundnuts and beans after tobacco. p. 12.

Makanga (Chiromo) Station.

(4) Maize/sesame inter-planting experiment; carried out to increase sesame cultivation and to provide an alternative cash crop. Sesame planted in February was more successful than earlier or later plantings. p. 12-13.

(5) Organic manuring and mulching experiment: designed to determine the effect of burying crop residues, to investigate various other methods of adding humus to the soil and to ascertain the effect of protecting the soil during the dry-season, either by means of a cover crop (pigeon pea) or by mulching. p.14.—K.O.

609 **Uganda Protectorate.** Annual Report of the Department of Agriculture for the period 1st April 1947—31st March 1948, Part. II. Experimental. Entebbe, 1950, pp. 96.

Plant emergence counts 14 days after sowing a cotton fertilizing trial indicated that rock-phosphate stimulated germination. There is evidence that the length of the growing season for cotton in the Kawanda area is extended during periods of overcast days. Of beans tried, Banja, Mutike 4, and Canadian Wonder gave the best results. Groundnut variety B. 239 showed itself superior to B. 227. Germination tests on *Urena lobata* showed that, for Kawanda, the best procedure is to pick seed from July to September, and to sow untreated seed the following year. Decorticating the seed is unnecessary. Results of fertility experiments at Ngetta and Serere show that yields are best with a low cropping ratio, (i.e. a long grass fallow compared with the cropping period), that a grass cover in the resting period is superior to an annual green-crop, and that farmyard manure increases crop yields for at least two years after its application. There is, so far, no consistant interaction between the different experimental treatments.—N.G.S.

610 **British Guiana.** Annual Report (Divisional) of the Department of Agriculture, for the year 1949. pp. 45.

Investigations reported :

(1) Variety trials, p. 37.
(2) Quasi-factorial variety trials, p. 37.
(3) Fertilizer trials, p. 37.—N.G.S.

611 **Trinidad.** Rice production. Report of Committee. *Proc. Agric. Soc. Trinidad and Tobago*, 1950, **50**, 65-77.

Eight recommendations, of which six have been accepted by the Government of Trinidad, are made for the promotion of increased rice production in the colony. Details are given of the cost of growing and preparing rice from 1 acre of land.—N.G.S.

612 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo Belge [INÉAC] Rapport annuel pour l'exercice 1949. [Annual report for 1949.] Gembloux. 1950, pp. 306.

Investigations Reported from various INÉAC Stations :

(1) Rice. Studies on water balance and transpiration. p. 23. Varietal trials. pp. 239 and 270.
(2) Chemical control of pests of rice, maize, kidney-bean, sesame, and groundnuts. p. 69.
(3) Cotton. Control of *Helopeltis bergrothi* by eradicating infested plants. pp. 74-6. Control of diseases and pests. pp. 79-80. Selection for wilt resistance, varietal trials, and edaphic factor. pp. 224-31. Cultural trials. p. 232-9. Varietal and cultural trials. pp. 243-5. Selection and cultural trials. pp. 247-53 and 267-9.
(4) Maize. Pest control in storage. pp. 77-8. Selection and varietal trials. pp. 240, 253-6, and 269. Varietal and cultural trials. pp. 284-5.
(5) Seed treatment of maize and ground-nuts. pp. 81-2.
(6) *Phaseolus vulgaris*. Control of *Bruchus obtectus*. p. 84. Varietal trials, pp. 193-4.
(7) Cassava. Varietal trials, pp. 194-5 and 269. Varieties. pp. 240-1 and 260-1.
(8) *Urena lobata*. Selection and cultural methods. pp. 218-20.
(9) Groundnuts. Selection, varietal and cultural trials. pp. 256-60 and 282-3. Varieties. p. 240.
(10) *Phaseolus angularis*. Cultural trials. p. 261.
(11) Fallow studies. pp. 110-1 and 263-5.
(12) *Pennisetum spicatum*. Selection. pp. 281-2.
(13) *Voandzeia subterranea*. Varietal trial. p. 285.
(14) Studies on rotations and cultural methods. pp. 112-4.
(15) Selection, cultural methods, and experimental technique with various food crops including *Coix lachryma-jobi*, maize, rice, groundnuts, *Phaseolus angularis*, *Soja hispida*, *Dioscorea* spp., cassava, sorghum, and wheat. pp. 115-23, 163-70, 290-3, and 295-6.—E.B.

613 **Morocco.** Direction de l'Agriculture, du Commerce et des Forêts. Production agricole. Les cahiers de la recherche agronomique. 2. [**Agronomic research papers. 2.**] Rabat, 1949, pp. 159.

(1) La zone méditerranéenne. [The Mediterranean region.] By G. Grillot. pp. 3-12, bibl. 3.
(2) Le milieu marocain. Apercu géographique et agricole. [The environment of Morocco. Geographical and agricultural outline.] By G. Grillot. pp. 17-40, figs, tables, bibl. 11.
(3) Considérations sur l'aridoculture au Maroc. [Observations on dry farming in Morocco.] By M. Dufresse. pp. 95-125, figs, tables, bibl. 15.
(4) Étude de climatologie comparée. Possibilités culturales du cotonnier. [A study of com-

parative climatology. Possibilities of cotton cultivation.] By G. Grillot and J. Iltis. pp. 129-39, tables, bibl. 6.

(5) Projet d'organisation d'une section de bioclimatologie agricole au Centre de Recherches Agronomiques du Maroc. [A project for organizing a section of agricultural "bioclimatology" at the Centre for agronomic research of Morocco.] By A. Vernet. pp. 143-59.—E.B.

614 **Sweden.** Årsberättelse över Sveriges utsädesförenings verksamhet år 1948. [Annual Report on the work of the Swedish Seed Association in 1948.] by Å. Åkerman. *Sverig. Utsädesfören. Tidskr.* 1949, **59**, 127-75.

The report includes an account of the work done at Svalöf on cereals, pulses, rootcrops, fibres and oil plants. [Abridged translation available]—R.P.J.

615 **Argentina.** Agricultural Experiment Station of the Province of Tucumán (Estación Experimental Agrícola de la Provincia de Tucumán). Report for the year 1947. *Rev. industr. agric. Tucumán* 1947, **37**, 23-39. [Received 1950]

616 **Argentina.** Labor de la Dirección General de Fomento Agrícola en el año 1949 [Work of the Dirección General de Fomento Agrícola in 1949.] [Contained in] *Bol. Prod. Fom. Agric.* Vol. 2. No. 15. pp. 20-45 and Vol. 2 No. 16, pp. 35-68. Buenos Aires, 1950.

This report is mainly concerned with the production and multiplication of seed, and the official registration of crop varieties. Mention is made of various research projects, but no details or results are given.—N.G.S.

617 **Illinois University** Agricultural Experiment Station. Progress in solving Farm Problems of Illinois. Report for 1947-48. Urbana, 1950. pp. 224.

INVESTIGATIONS REPORTED:

(1) On the protein content of maize grain. pp. 17-19. Data are given of the relation between the rate of sowing of maize and the soil nitrogen content, to the yield and protein content of maize.

(2) On the effect of fertilizer nitrogen on yield and composition of soyabeans. p. 19. See Abs. 405.

(3) On the changes needed in the hot-water treatment for loose smut. p. 24. Some soft red winter wheat varieties needed higher treatment temperatures for *Ustilago tritici* control than the recommended 129°F. Pre-soaking of seed for 5 to 6 hrs., followed by hot-water treatment for 10 min. at 130°F. has given complete control of *U. tritici* in all varieties so far tested.—P.J.B.

618 **Kentucky** Agricultural Experiment Station. 62nd. Annual Report. Result of Research in 1949, pp. 92. [Received 1950]

INVESTIGATIONS REPORTED:

(1) Relation between plant population and yield of corn [maize] at Mayfield. p. 11.

(2) Control of weeds in corn [maize] with chemicals. p. 11.

(3) Tolerance of corn [maize] hybrids to 2,4-D. p. 12.

(4) Yields of commercial corn [maize] hybrids. p. 14.

(5) Yields of certified and experimental corn [maize] hybrids. p. 14.

(6) Soyabean varieties. p. 24. Wabash, a recently introduced yellow soyabean variety produced higher yields than any of the 5 other varieties tested.

(7) Varieties of winter wheat and winter barley, fall-sown and spring oats. pp. 24-5.—C.L.S.

619 **Louisiana** Agricultural Experiment Station. Annual Report 1948-1949. Baton Rouge, 1950, pp. 196.

INVESTIGATIONS REPORTED:

(1) Rice drying with radio-frequency heat. By F. T. Wratten. p. 30.

(2) Cotton investigations in 1949. Variety trials. By F. W. Self and others. p. 43. The varieties Deltapine 15, Louisiana 33 and Empire were among the leading varieties in three year's varietal trials at five locations and have shown themselves adapted to any cotton growing area in Louisiana.

(3) Release of Louisiana 41-1219 soyabeans. By J. Gray. p. 57. See Abs. 403.

(4) The effect of insecticide applications early in the fruiting period upon boll weevil populations and yield of cotton. By L. D. Newsom and others. p. 72.

(5) The effect of aphid infestations on the vegetative growth and fruiting behaviour of cotton. By T. R. Pfrimmer and others. pp. 73-4.

(6) Relation of boll-set in cotton to blossoming date. By L. D. Newsom and others. p. 74.

(7) Seed treatment for water-planted rice. By J. G. Atkins and P. Boucherau. p. 93. Under continuous-flooding conditions, seed treatment with 2 oz. per bu. of yellow Cuprocide improved stands of rice.

(8) Seed treatment for drilled rice. By J. G. Atkins. p. 93.

(9) Weed control in cotton. By L. E. Cowart and E. R. Stamper. p. 94.

(10) Weed control in rice. By T. C. Ryker and E. R. Stamper. p. 97.—P.J.B.

620 **Missouri** Agricultural Experiment Station. Bull. 535. Annual Report June 30th, 1948 to July 1st, 1949. Columbia, 1949, pp. 103. [Received 1951]

INVESTIGATIONS REPORTED :

(1) The effect of different methods of seed-bed preparation for wheat following lespedeza. By M. M. Jones and others. p. 20.
(2) Hybrid maize tests in nine locations in Missouri. By M. S. Zuber. p. 60.
(3) Soyabean varieties. By C. V. Feaster. p. 61.
(4) The effect of applications of lime and rock phosphate on the yield of corn, soyabeans and wheat. By C. E. Marshall and others. p. 81.
(5) The effect of crop rotation on the yield of wheat. By W. A. Albrecht and others. p. 85.—G.W.S.H.

621 **Nebraska University** Agricultural Experiment Station. 63rd Annual Report. Lincoln, 1950, pp. 162.

INVESTIGATIONS REPORTED :

(1) Soil conservation problems on sandy land. By F. L. Duley and others. pp. 5-8. See Abs. 490.
(2) Effect of soil micro-organisms and plant material on geotropism and growth of germinating maize. By R. P. Matelski. pp. 8-9.
(3) Fertilizers for winter wheat. By R. A. Olson and others. pp. 16-17.
(4) Influence of irrigation practice, seeding rate and fertilizer applications on the production of safflower [*Carthamus tinctorius*]. By O. W. Howe and H. F. Rhoades. p. 20.
(5) Cultural experiments with sugar beets. By L. Harris and others. pp. 20-1.
(6) Influence of irrigation practice, plant population and fertilizer application on the yield of maize. By O. W. Howe and H. F. Rhoades. p. 22.
(7) Dry-land crop rotations at North Platte. By L. L. Zook and others. pp. 30-3.
(8) Crop rotations under irrigation at Scottsbluff. By L. Harris and F. V. Pumphrey. pp. 33-5.
(9) Sorghum improvement. Effect of 2,4-D on sorghum varieties. By O. J. Webster. pp. 41-2. See Abs. 364.
(10) Weed control research. Effect of 2,4-D on weed-free grain crops. By N. E. Shafer and D. L. Klingman. p. 51. See Abs., 505.
(11) Perennial weed control. By N. E. Shafer and D. L. Klingman. pp. 51-2. Three water-soluble boron compounds, Polybor, Polybor-chlorate and Chlorax have given promising results in the control of small areas of perennial noxious weeds.
(12) Sugar beet diseases. By M. L. Schuster. pp. 67-8. Application of Arasan at 5 lb. per acre on each side of seed drill rows resulted in an 80 % increase in stand on a plot heavily infested with damping-off and root-rot pathogens, as compared with an untreated control.—P.J.B.

622 **North Dakota** Agricultural Experiment Station. Annual Report for 1949. Fargo, 1950, pp. 87.

INVESTIGATIONS REPORTED :

(1) Effect of variety and location on protein content, and of location on yield and bushel weight of barley. pp. 10-11.
(2) Barley variety trials. Tregah, a feeding type, has given the highest yields in three series of trials. Kindred and Montcalm are the highest yielding malting barleys. pp. 12-3.
(3) Barley stipa disease, net blotch and spot blotch were controlled by seed treatment with Panogen, Ceresan and Ceresan M slurry. p. 13.
(4) Maize breeding. Breeding for cold resistance is being undertaken. pp. 14-16.
(5) Removal of NPK from the soil by cereals and flax. [Information for calcium, magnesium and sulphur available, but not published.] pp. 17-18.
(6) Oat variety trials. The leading varieties are Gopher, Ajax, Rainbow and Fortune. p. 19.
(7) Rye variety trials. The White Soviet variety leads at four centres. p. 19.
(8) Wheat breeding. The hard red spring wheats Mida and Rival lead in the variety trials and are resistant to black stem rust. Breeding is now directed to leaf rust resistance. pp. 19-22.
(9) Flax varieties and seed treatment. pp. 24-5.
(10) Effect of summer fallowing on subsequent wheat crops. p. 41.
(11) Methods of cultivation for cropping with wheat. Mouldboard ploughing, either in autumn or spring, gave higher yields than were obtained from discing or cultivating. p. 41.
(12) Effect of a maize crop on subsequent wheat crops. p. 42.
(13) Effect of rotations on the yield of wheat. Rotations which included sweet clover or peas gave higher yields than rotations without a leguminous crop. In another experiment the highest yield was obtained by ploughing under the first growth of clover. Taking a hay crop reduced yields. p. 42-3.

(14) Phosphate manuring of wheat. Drilling was superior to broadcasting, and high analysis superphosphate gave highest yields. pp. 43-4.
(15) European maize borer. p. 65.
(16) Soyabean varieties. The highest yielding variety was Manchu (Montreal strain). p. 32.
(17) Control of green bug on cereals by spraying from aircraft. TEPP and parathion controlled the insect if applied in dry weather before damage had been done. p. 65—C.W.S.H.

623 **Ohio** Agricultural Experiment Station. Bull. 695. Farm Science and Practice. 68th Annual Report. Wooster, 1949, pp. 97. [Received 1951]

INVESTIGATIONS REPORTED :

(1) Variations in the niacin and pantothenic acid content of different maize strains. By C. Hunt, and others. pp. 31-2.
(2) Factors affecting vitamin B complex content of cereal grains. By C. H. Hunt and others. pp. 48-9.
(3) New wheats for Ohio. By C. A. Lamb. pp. 53-4. Notes on two new varieties, Butler and T.N. 1016-4. They are bearded, white chaffed, soft red winter wheats.
(4) Use of 2,4-D on small grains. By W. C. Shaw and C. J. Willard, pp. 75-6. See Abs. 506.
(5) The effect of 2,4-D applications, with and without subsequent cultivation, on maize yields. By C. J. Willard and W. C. Shaw. p. 76. In tests involving 370 plots, one cultivation for weed control, in addition to normal pre-emergence and post-emergence treatments with 2,4-D, resulted in an average yield of 101 bu. per acre, compared to 92 bu. per acre from plots treated similarly with 2,4-D, but not cultivated.
(6) New quackgrass [*Agropyron repens*] killer. By W. C. Shaw and C. J. Willard. pp. 76-7. Trichloroacetic acid (TCA) at a rate of 20 lb. per acre completely eradicated *A. repens* from plots where the *A. repens* was ploughed under, after which the soil was worked down to a good tilth, and the T.C.A. applied as a solution to the soil surface.—P.J.B.

624 **Oregon** Agricultural Experiment Station. Bull. 491. Oregon's Agricultural Progress through Research. 1950 Annual Report. Corvallis, 1950. pp. 165.

INVESTIGATIONS REPORTED :

(1) Sugar beet seed studies. p. 14. Studies of soil factors influencing sugar beet yields are in progress.
(2) Fibre-flax varieties tested. pp. 22-3.
(3) Time of planting and wax-content in flax. p. 25. Wax-content of fibre-flax increased markedly in the last stages of maturity. Less wax was found in flax planted early than late-planted flax, when both were harvested at the same number of days after sowing.
(4) New fibre crop studied. pp. 25-6. *Phormium tenax* is the only hard-leaved fibre crop that will grow inside the continental limits of the U.S.A. It is both drought- and frost-resistant and is of value in preventing soil erosion.
(5) Safflower tested as a dry-land crop. pp. 26-7. —P.J.B.

625 **Pennsylvania** Agricultural Experiment Station, Bull. 515. Science for the farmer. 62nd. Annual Report, State College, 1949. pp. 66.

The fourth year of trials on a number of winter wheats showed that Thorne failed to maintain its yields, mainly as a result of lack of leaf-rust resistance. A number of unnamed wheat varieties tested showed resistance to both leaf-rust and Hessian-fly. Wong winter barley maintained its high yield. Moore spring barley in its third year of testing yielded well and showed considerable resistance to lodging and mildew. Clinton and other Bond crosses of spring oats yielded well, Clinton and Mohawk being particularly stiff-strawed. Ajax yielded well, but was not so stiff-strawed as the better Bond crosses. The six leading seed varieties of soyabean over the past four years have been : Chief, with 32.1 bu. per ac. ; Late Pennsoy, 31.5 ; Viking, 31.4 ; Pennsoy, 30.9 ; Patoka, 30.8 and Lincoln, 30.7. Trial results showed that 100 lb. of TCA per ac. killed about 99 % of the *Agropyron repens* in trial plots ; but IPC did not prove effective. 1 lb. of 2,4-D per ac. killed all the above-ground parts of garlic, but did not kill the bulbs. Applications of 1/4 lb. of the amine and 3/8 lb. of the sodium salt of 2,4-D per ac. gave satisfactory weed control in clover undersown in oats when the oats were 7 in. high. without materially damaging the clover seedlings.—P.J.B.

626 **Wyoming** Agricultural Experiment Station. 58th Annual Report. 1947-48. Laramie, 1948, pp. 64. [Received 1951.]

INVESTIGATIONS REPORTED :

(1) Bean diseases, pp. 15-17. Bean seed treated with New Improved Ceresan dust and heated to 175°F. for 35 min. was completely cleared of bacterial blight, without impairing its germination.
(2) Nine sugar beet rotations compared. pp. 49-53.
(3) A comparison of fifteen crop rotations incorporating winter and spring wheats. pp. 45-9.—P.J.B.

627 **Wyoming** Agricultural Experiment Station. 59th Annual Report. 1948-9. Laramie, 1949, pp. 48. [Received 1951]

INVESTIGATIONS REPORTED:

(1) Yield of spring wheats. pp. 7 and 34-7.
(2) The winter-hardiness of winter wheat varieties. p. 8.
(3) Yield of oat varieties under dry conditions and with irrigation. p. 8.
(4) Yield of barley varieties. pp. 8-9 and 34-7.
(5) Yield of various maize hybrids at different altitudes. pp. 9-10.
(6) Control of blight, rust, and white mould of beans, and Mexican bean beetle. pp. 13-14.
(7) The effect of constant cropping of field beans on yield and soil conditions. p. 14.
(8) The control of Canada-thistle, (*Cirsium arvense*), white top (*Lepidium draba*) and Russian knapweed (*Centaurea* sp.) by 2,4-D. pp. 14-15.
(9) The effect of applications of ammonium nitrate and of 2,4-D on the yield of barley. p. 33.
(10) Yield of oat varieties. pp. 34, 36, 37.
(11) The effect of certain cropping combinations on wheat, oat and barley varieties. pp. 34-5.
(12) The effect of ammonium nitrate, ammonium phosphate and treble superphosphate on the yield of barley. p. 38.
(13) The effect of ammonium phosphate and ammonium nitrate on sugar beet yields. p. 38.—C.W.S.H.

NEWS ITEMS AND NOTES

Great Britain

628 SUGAR BEET. Experiments are to be conducted in Scotland to test the effect of Arasan (TMTD) on strangles, the causal agent of which is as yet unidentified. Successful control of black root, a disease similar to strangles and believed to be caused by the fungus *Aphanomyces cochlioides*, has recently been achieved in America and Canada, using TMTD. *Brit. Sug. Beet Rev.* September, 1950.—E.B.H.

629 NEW HIGH PROTEIN FEED FROM SUGAR BEET TOPS. At a recent Yorkshire harvester demonstration, Mr. M. Goodall exhibited high-protein pellets made from dried sugar beet tops. The method of producing these involves the removal of fibre from the tops and the disposal of surplus moisture from the resultant product, by centrifugal force and pressing, so that the moisture remaining to be evaporated by heat is very much reduced, thus saving fuel. The dried product can be produced as a meal, pellets or cakes. *Brit. Sug. Beet Rev.* December, 1950.—K.O.

Persia.

630 AGRICULTURE. Of Persia's 650,000 sq. miles, 10-15 % is under cultivation, 15 % is grazed, and a further 20-30 % is considered suitable for cultivation. Agricultureal methods have changed little since Biblical times, and the peasants remain hostile to innovations. Rainfall varies from 2 in. to 50 in. and temperature from 4°F. to 122°F. Wheat is the principal crop, the average annual production being about 2,250,000 tons. Yields depend upon irrigation facilities, or on the rainfall, which must fall between February and April if the crop is to succeed. In the Persian Gulf Area, the average return is only one good crop and 2 to 3 medium crops over a period of 11 years. Rice is grown in the Caspian provinces of Gilan and Mazanderan. Thirty to forty thousand tons of sugar beet are produced each year. Sugar cane was once grown under irrigation, and it is hoped to revive this crop. Cotton has declined in importance. Castor oil and sesame are the most important oilseeds, apart from cotton seed. Essentials for improvement are: the use of a plough which really turns the soil; the introduction of irrigation systems; the establishment of crop rotations; more scientific husbandry; the raising of fertility; mechanisation. Windbreaks need to be established to check wind erosion. Adequate storage provision is required. It is suggested that flax and soyabeans might successfully and profitably be grown. 25 major irrigation plans are being undertaken. The Veramin Plains Irrigation Project, the Shushtar Irrigation Project, and a third project near Hamidieh village, about 30 miles north-west of Ahwaz, are briefly described. *World Crops* 1951.—N.G.S.

Belgium.

631 SEED EXCHANGE. The Botanic Garden of Brussels offers seed of the year 1950 in exchange. Particulars of the seed available may be obtained from supplement 1 of Vol. 20 of the *Bull. Jard. bot. Brux.*, or from this Bureau.—D.B.

Hungary

632 COTTON GROWING. About 280,000 acres are considered suitable for cotton growing. The National Cotton Growing Enterprise has been formed to further this. As a result of encouraging results, over 14,000 acres of short-fibre type cotton were planted in 1950. Experiments with long fibre cotton and with coloured cottons are in progress. Bulgarian and Russian seed was used. The cotton is planted close together, ripens early, and grows to only a little over 12 in. high. The upper shoots are trimmed towards the end of August. Shelter belts of maize or sunflower are planted at 50 yard intervals. Manured and nitrogen-rich soils have been found unsuitable. The yield is 5½-6½ cwt. cotton per acre [not stated whether seed cotton or lint].—*World Crops* 1951.—N.G.S.

taly

33 CEREAL YIELD IN LOMBARDY. The results of the second Lombard competition in cereal cultivation (1949-50) howed that cereal yield per unit area in Lombardy was igher than in all the other regions of Italy. The yield of wheat, which is now treated as a weeded crop in Lombardy, varied from 44 to 72 q./ha. in the plain and from 43 to 5 q./ha. in the hills. To arrive at the total annual cereal production, the yield of maize or rice, which are grown in summer after wheat, must be added to that of wheat. The yield of summer maize varied from 32 to 56 q./ha. and the yield of rice, which can be grown after wheat only if ransplanted, from 71 to 92 q. of paddy per hectare.—G. *Agric. Domen*. 1951, Jan. No. 2.—E.B.

34 AGRICULTURAL APPROACH BETWEEN ITALY AND FRANCE. An Italian-French agricultural conference met n Rome in February, 1951, to study the possibility of an gricultural agreement between the two countries. Among he matters discussed was the problem of common agriculural exports in which France and Italy are competitors, nd the exchange of wheat and rice, France being a wheat xporter and rice importer while in Italy the position is reersed.—*G. Agric. Domen*. February, 1951, No. 7.—E.B.

Malaya

35 IRRIGATION. An irrigation project, known as the alor Pumping Scheme, which it is estimated will cost 25,000, is to be introduced by the Kelantan State Government. The scheme will serve as a 'pilot' for the Kelantan Plains Irrigation Scheme. The Salor area includes some of he best padi land in the State. Water will be drawn from he Kelantan River by pumps supplying 786,000 gallons er hour. *World Crops* Jan. 1951.—N.G.S.

Nigeria

36 AGRICULTURAL DEVELOPMENT. An experimental mechanised farming scheme was begun in March 1949 at Mokwa, Northern Nigeria, under the auspices of the olonial Development Corporation. The scheme is nown as the Nigerian Agricultural Project. The object f the scheme is to weld modern farming methods with cal agricultural skill. So far, over 4,000 acres of orchard bush have been cleared, and over 2,000 acres planted with maize, 90-day sorghum, guinea corn, millet, beniseed, soya, *Hibiscus cannabinus*, groundnuts, tobacco and cotton. Fields are of 24 acres. Three of these fields will be divided between every two settlers. It is intended that one-third of the allocated area will always be in fallow or under grass. Windbreaks have been planted around the fields to prevent wind and rain erosion. *Colonial Development* 1950.—N.G.S.

637 COLONIAL DEVELOPMENT. In conjunction with the Nigerian Cocoa and Cotton Marketing Boards the Colonial Development Corporation is forming a company to be known as the Nigerian Fibres Industries, Ltd, which will operate a combined produce-bag factory and cotton spinning mill on a site near Onitsha in Nigeria. The sack factory should be capable of producing about 6 million sacks per year when in full production, and it is expected that there will be an increase in the local acreage of fibre crops so that it will gradually become unnecessary to use imported material. The adjoining cotton spinning plant should be capable of producing about 2 million lb. of cotton yarn per year. The total capital investment in this project will be around £1,800,000, of which just over half will be subscribed by the Colonial Development Corporation. *World Crops* Jan. 1951.—N.G.S.

Pakistan

638 COTTON RESEARCH. An Institute of Cotton Research and Technology is to be established at Karachi. The building will be air-conditioned in such a way as to enable tests to be made under controlled atmospheric conditions. The administrative offices of the Central Cotton Committee, a library and a museum will also be housed in the same building. *New Commonwealth* 1951.—N.G.S.

639 METEOROLOGY. A Meteorological Institute is to be set up at Karachi. The Institute will include observavatories, laboratories, a wind tower, a records library, and a general weather bureau. *New Commonwealth* 1951.—N.G.S.

FIELD CROPS

CEREALS

WHEAT

640 Shelley, R. W. **Heavy soils for wheat growing. Management in Central Western Districts [N. S. Wales].** *Agric. Gaz. N.S.W.* 1951, **62**, 11-5.

A general description is given of wheat growing on the heavy lands of New South Wales. The strong-strawed, and early maturing wheat varieties Gabo and Koala are recommended for heavy land.—K.O.

641 Miller, Jean G. **Survey of wheat crops [in N. Zealand] to define factors affecting yields.** *N.Z.J. Agric.* 1950, **80**, 431-4. [Dep. Agric., Wellington, N.Z.]

The survey has shown so far that an important factor affecting wheat yields is the previous rotational history of the paddock. Though the evidence is not yet conclusive, the best yields appear to be obtained after a good grass pasture, after peas, or after fed-off crops. However, if the pasture is poor, infested with weeds or grass-grub, or inadequately worked, the result may be worse than that obtained by sowing after another cereal crop. There is little difference between the yields from wheat varieties being used at present, but Cross 7 may give slightly better yields than the Tuscan group (Fife Tuscan and Solid Straw Tuscan). Though autumn sowing does not always give better results than spring sowing, it never gives worse and can result in very much better wheat yields. Such a result, of course, depends to some extent on the weather and soil conditions at the time of sowing.—From author's summary.

642 Fuggles-Couchman, N. R. **Wheat production in Tanganyika.** *World Crops* 1951, **3**, 183-7, bibl. 7.

643 Hitrinskiĭ, V. F. **[Improving the yield and quality of spring wheat (by winter sowing).]** [Russian] *Selek. Semenovod.* 1950, **17**, No. 10, 5-9.

The spring wheat varieties Lutescens 1163, Odesskaja 13 and Melanopus 69 when sown in early winter, 1948, developed and ripened earlier than when sown in the spring and gave an increased yield of better quality grain. Early winter sowing is also an effective method of combating loose smut (*Ustilago tritici*). The resistance of different varieties of spring wheat to low temperatures experienced under winter sowing conditions varies, soft wheat varieties being generally more cold resistant than hard varieties. Sowing at a depth of 7 to 8 cm. and at a seed rate 25 % higher than with spring sowing are necessary to obtain the best results from early winter sowings of spring wheat.—R.P.J.

644 Šefer, A. I. **[Influence of the soil on yield and quality of the grain of spring wheat.]** [Russian] *Selek. Semenovod.* 1950, **17**, No. 9, 61-3.

Experiments were conducted, on different soils, at the Siberian Institute of Grain Husbandry with 4 varieties of spring wheat : Milturum 321, Lutescens 62, Lutescens 479 and Aljbidum 3700. All the varieties completed growth more rapidly on solonetz than on chernozem soil. In Lutescens 479 the difference in ripening on chernozem soil and on solonetz was 3 days ; in Lutescens 62, 4 days ; in Aljbidum 3700, 2 days, and in Milturum 321, 5 days. The highest yield and absolute weight of grain was obtained in all varieties on chernozem and weak solonetz soil and the lowest yield on solonetz.—R.P.J.

645 Geroev, M. Ja. **[Winter wheat in the north-eastern zone of Baškir.]** [Russian] *Selek. Semenovod.* 1950, **17**, No. 9, 45-9.

According to data from 12 years' investigations, thinning out of plants and resultant low yields of winter wheat on the Duvan varietal experimental grounds were due to harsh winters, severe spring frosts and unsatisfactory agrotechnical measures. To obtain high yields, farmyard manure (40 tons per ha.) should be applied and sowing should be done about 10th August. The most winterhardy varieties under north-eastern Baškir conditions were Uljanov and Milturum 122.—R.P.J.

646 Almeida Alves, J de. Efeito da cultura do *Cicer arietinum* L. e da *Vicia sativa* L. var. *obovata* Ser. sobre algumas propriedades físicas e químicas do solo. 1. Primeira tentativa de explicação dum melhor " ensejo " para o trigo. **[Effect of cultivating *Cicer arietinum* and *Vicia sativa* var. *obovata* on some physical and chemical properties of the soil. 1. Preliminary tentative explanation of the better cover crop upon wheat.]** *Melhoramento* 1950, **3**, 93-111, bibl. 13, English summary, pp. 109-10. [Lab. Química Esta. Melhoramento de Plantas, Elvas, Portugal]

It is the common practice, in the region of Elvas, to grow chickpea (*Cicer arietinum*) as a cover crop before wheat. It was found that greater yields were obtained after *Vicia sativa* var. *obovata* [in a single instance]. An explanation of this is offered, based on soil analyses and the different effect of the two root systems on soil structure and water economy. —N.G.S.

647 Canada. Department of Agriculture, National Research Council, Associate Committee on Plant Breeding. **Report on co-operative tests of durum wheat varieties, 1950** [n.d.], pp. 14. [Mimeographed]

Data are given on trials with the following varieties at 10 locations in Manitoba, Saskatchewan, Alberta and North Dakota: Mindum, Golden Ball, Carleton, Stewart 221, Pelissier, three 1742 × Carleton^2 crosses, three 1742 × Carleton crosses, two (1742 × Carleton^2) × Pellissier crosses and two (Mindum × Carleton) × (Heiti × Stewart) crosses.—P.J.B.

648 Illinois Agricultural Experiment Station. Circ. 643. **Winter wheat, varieties for Illinois.** By *J. W. Pendleton* and others. 1949, pp. 4.

649 North Carolina Agricultural Experiment Station. Spec. Circ. No. 8. **Atlas wheat. Strains 50 and 66.** By *G. K. Middleton* and *T. T. Herbert*. 1950, pp. 8.

The strains 50 and 66 of Atlas, a soft, red, winter wheat, are well-adapted to the Coastal Plain and Piedmont areas of the State, but are not sufficiently winter hardy for mountain areas. Both strains have strong straw and their grain is of satisfactory milling and baking quality. Atlas 50 has shown good resistance to powdery mildew and fair resistance to leaf rust. Atlas 66 has shown excellent resistance to leaf rust and fair mildew resistance.—K.O.

650 Agricultural Gazette of New South Wales. **Varieties of wheat recommended for 1951 sowing [in New South Wales].** *Agric. Gaz. N.S.W.* 1951, **62**, 17-22, 40 and 52.

Varieties for early, mid-season and late sowings are recommended for the zones of the northern, central and south wheat belts. Short descriptive notes are given on the following varieties: Baroota Wonder, Bencubbin, Bordan, Bungulla, Celebration, Charter, Dundee, Eureka, Eureka 2, Fedweb 1, Florence, Ford, Gabo, Glenwari, Gular, Insignia, Kendee, Koala, Magnet, Pusa 4, Pusa 111, Quadrat, Ranee, Waratah, Warigo, Yalta and Zealand.—K.O.

651 Lein, A. Asiatische Weizensortimente. [**Asiatic wheat varieties.**] *Kühn-Arch.* 1949, **62**, 216-310, bibl. 42. [Inst. Acker-und Pflanzenbau, Univ. Halle, E. Germany]

Comparative studies have been made of wheats collected during the German Hindukush expedition of 1935-36, the Indian/Nepal journey of Herrlich in 1937-38, and the Thibet expedition of 1938-39. The Hindukush and N.W. India are, according to Vavilov, gene centres for hexaploid wheats. Asiatic wheats are diverse in form. From each population group, individuals were chosen which would, together, represent the whole range of heritable characters of each of the three groups. Their progeny were studied not only for morphological characters but also for quantitative and physiological characters. An attempt has been made to trace the connexion between wild and cultivated wheats and the evolution of cultivated wheat from the wild forms.—D.B.

652 Ermolenko, A. P. [**Surhak Jubileĭnyĭ—a new form of the wheat variety Surhak 5688.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 9, 50-1. [Tadžik State Plant Breed. Sta.]

Surhak Jubileĭnyĭ is a new form of the wheat variety Surhak 5688 and was bred at the Tadžik State Breeding Station. Data obtained in 1949 showed that the straw of the new variety was nearly 15 cm. shorter than that of Surhak 5688. This reduction in length was due not only to shortening of the internodes but also to a decrease in their number. In 1949 the average length of straw in autumn-sown Surhak 5688 was 85.5 cm. and the number of internodes 6; in Surhak Jubileĭnyĭ the corresponding figures were 71.1 cm. and 5. The ear of the latter form is erect, 9 cm. long, the average number of spikelets is 18, average weight of grain per ear is 2 grm., and absolute weight 56 grm. In spring-sown Surhak 5688, the length of straw was about 60 cm., the length of ear 7 cm., the number of spikelets 13, the weight of grain per ear 1 grm, and the absolute weight 44 grm. —R.P.J.

653 Dionigi, A. Il frumento Nazareno Strampelli 2. [**The wheat variety Nazareno Strampelli 2.**] *G. Agric. Domen.* 1951, **61**, 123. [Sta. sper. Granicolt. N. Strampelli, Rieti, Italy]

[See *Fld Crop Abstr.* 2, Abs. 135] This new wheat variety, obtained from the same parents (Mentana × M 33 A] as N. Strampelli 1, forms its spikes on an average 4 days earlier than the latter. It is very rust resistant, and is thought to be frost resistant. —E.B.

654 Kondō, M., and Kasahara, Y. Feststellung der Sortenechtheit des Weizensaatgutes durch Tyrosinfärbung. Vergleich mit Phenolfärbung. [**Determination of varietal purity of wheat seed by means of tyrosine stain. Comparison with the phenol stain.**] *Ber. Ōhara Inst. landw. Forsch.* 1943, **9**, 151-5, bibl. 3. [Received 1950] [Ōhara Inst. Agric. Res. Kurashiki, Japan]

The presence of phenolase and tyrosinase in wheat grains has been established. They give rise to the specific colouring produced in the grains on treating them with phenol and tyrosine. In practice, phenol is a more suitable colouring agent than tyrosine for distinguishing varieties, though results with both reagents run parallel.—D.B.

655 VENINO, P., and MOIA, A. Rilievi nell'impiego di alcuni preparati fitormonici. [**Note on the use of some plant hormone preparations.**] *Ann. Sper. agr.* 1951, **5**, 297-308, English summary pp. 307-8. [Ist. Agron. Univ. Milano]

Three years' laboratory and field trials were carried out at the above institute to study the effect of certain hormone preparations, applied to the seed, on the development and yield of the plant. In comparison with untreated plants, the treatment of wheat seed with "Behmisina" caused a slight delay in the first development phase and no increase in grain yield. The treatment of maize seed with "Aumentan" had a stimulating effect on the first development phase in the laboratory trial but the following development phases, particularly on the field, and the grain yield were not affected.—E.B.

656 GRASSO, V. La resistenza dei grani duri alle carie (*Tilletia* spp.). [**The resistance of *Triticum durum* to bunt (*Tilletia* spp.).**] *Ann. Sper. agr.* 1951, **5**, 411-8, bibl. 13, English summary p. 417. [Ist. Patol. forest. agr. Univ. Firenze]

The bunt resistance of the most important hard wheat varieties grown in Italy was investigated in 1949-50. Four soft wheat varieties were also tested for comparison. The trials took place in different localities, in central and southern Italy and Sardinia, with seeds artificially infested with *Tilletia* spp. From the results it appeared that none of the varieties was immune, but the hard wheat varieties were as a whole more resistant than the soft varieties. Of the latter, Mentana, Trento, Avanzi 8 proved very susceptible ; Solina alone showed high resistance. As to the hard varieties, their resistance varied according to the locality of their cultivation. Russello S.G.7 was the most resistant. Senatore Cappelli, Garigliano and Timilia also proved generally very resistant, and Dauno, Saragolla and Azizia rather susceptible. It is considered advisable for cultivators to disinfect wheat seed of all varieties with anti-bunt preparations.—E.B.

657 DE CAPITE, L. Azione della sparteina sull'attività respiratoria del *Triticum vulgare* var. Quaderna. Nota preventiva. [**The effect of sparteine on the respiratory activity of *Triticum vulgare* var. Quaderna. Preliminary note.**] *Ann. Fac. Agr. Univ. Perugia* 1948, **5**, 156-64, bibl. 15. [Received 1951] [Ist. Bot. Univ. Perugia, Italy]

The investigation described is a contribution to the study of the function of alkaloids in plants. *Triticum* was chosen as the test plant because it has no alkaloids. Wheat plants at the 2-leaved stage were kept for 36 hours in nutrient solutions containing different concentrations of sparteine sulphate. Care had been taken that the solutions with sparteine had the same pH as the control solution. From the measurement of the respiratory activity, it appeared that treatment with solutions of sparteine sulphate at 0.1% and 0.05% decreased the respiratory activity of the wheat plants and that solutions at 0.001% and 0.0005% increased it.—E.B.

658 LEE, J. W., and UNDERWOOD, E. J. **The influence of variety on the thiamin and nitrogen contents of wheat.** *Aust. J. exp. Biol. med. Sci.* 1950, **28**, 543-8, bibl. 10. [Inst. Agric., Univ. West. Australia]

The thiamin and nitrogen contents of samples of the wheat varieties Bungulla and Charter were determined. A significant effect of variety and environment on both thiamin and nitrogen content was found.—K.O.

659 WEISSMANN, G. S. **Growth and nitrogen absorption of wheat seedlings as influenced by the ammonium : nitrate ratio and the hydrogen-ion concentration.** *Amer. J. Bot.* 1950, **37**, 725-38, bibl. 52. [Columbia Univ., New York, N.Y.]

660 BURSTRÖM, H. **Studies on growth and metabolism of roots. V. Cell elongation and dry matter content.** *Physiol. Plant.* 1951, **4**, 199-208, bibl. 10. [Botanical Laboratory, Lund, Sweden]

The influence of the auxin 3-indoleacetic acid and the anti-auxins α-(parachlorophenoxy) isobutyric acid and α-3-indole-isobutyric acid on the growth and composition of wheat roots was studied. Even with a doubling of the cell elongation and the stretching of the whole roots, the insoluble nitrogen and nitrogen-free organic compounds undergo only slight, or no, changes. It is concluded that the elongation mechanism is not connected with a new formation of cytoplasmic or wall substances. Consequently, auxin can hardly interfere, primarily, in these parts of the metabolism. The two phases of growth, the cytoplasmic growth and the cell elongation, appear to be physiologically separated, even if they normally overlap.—R.P.J.

661 GESLIN, H. A propos de la printanisation des blés. [**Vernalization of wheat.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 703-4, bibl. 3.

Trials described in this and previous reports have led to the conclusion that the technique of wheat vernalization is impracticable on a large scale in France. It is only of use for laboratory experiments. —K.O.

662 CLAVER, F. K., and SÍVORI, E. M. Estudio de la reacción al fótoperíodo y temperaturas de tres variedades de trigo. [**Study of the reaction to photoperiod and temperature of three wheat varieties (in Argentina).**] *Rev. Fac. Agron., La Plata*, 1950, **27**, 129-40, bibl. 25. English summary p. 139.

The three wheat varieties used were Kanhard, Klein 31, and Lin Calel. Klein 31 is an early-maturing spring wheat. The seeds were germinated and, when the pericarp began to break, they were put in a refrigerator in which the temperature varied between 3 and 5°C. The cold treatments, of 46, 42, 36, 30, 24, 16 and 6 days, were arranged to finish on the same day. The control seeds were put to germinate three days before the treatments ended so that they should be in a comparable stage of germination. All seeds were sown under three conditions : in the greenhouse in continuous light ; in the greenhouse in natural light ; and in the open air in natural light. Light was provided in the greenhouses by 110 w. fluorescent lights. The average maximum and minimum temperatures were 22.4 and 19.3°C in the open air, and 31.1 and 21.9°C in the greenhouses. The results are expressed in tabular form. The shortest periods to flowering were obtained with 24-30 days cold treatment in the case of Klein 31 (vegetative period to ear formation 34 days), 42 or more days cold treatment for Kanhard (vegetative period 40 days), and 16-24 days cold treatment for Lin Calel (vegetative period 45 days). The higher temperatures obtaining in the greenhouse resulted in shortening the vegetative period. Klein 31 was more precocious in natural light than under continuous light, while Lin Calel and Kanhard were more precocious under continuous light than under natural light. Further studies with vernalized Lin Calel showed that this variety is a spring wheat, but has a high light requirement. Under 24 hrs of light per day, the vegetative period to ear formation is 44 days. With 10 hrs light per day, the period is 155 days ; with 8 hrs light, the ears are formed but do not normally appear ; with 6 hrs light, seed sown in September had produced primordial flowers by the end of February.—N.G.S.

663 KORNILOV, A. A. [**The beginning of the light stage of development in spring wheat.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **76**, 929-32, bibl. 10. [Karagandinsk Agric. Expt Sta.]

Results of experiments with the spring wheat varieties Lutescens 62, Melanopus 69, Hordeiforme 189 and Akbidaĭ 630 conducted from 1944 to 1947 are reported. Measurements of the leaves indicated that vernalization reduces the time of growth of the first leaf, but accelerates and intensifies the growth of the following three to four leaves. But simultaneously with the acceleration of growth in early-ripening varieties of wheat, the metabolism in the first leaves is changed under the influence of vernalization. Thus, in vernalized plants only in the first few days after germination is there an increased accumulation of plastic substances, and then the first leaf begins actively to react to continuous illumination, and the plant passes through the light stage without considerable delay. Consequently, under field conditions, vernalized plants begin earlier to pass through the light stage, with consequent more rapid growth of the leaves. In plants from ordinary untreated seeds in all the wheat varieties investigated, the first leaf remains photoperiodically neutral during the whole period of its existence. The passage through the light stage begins in the second green leaf phase. The determination of the beginning of the light stage, according to a change in the reaction to the photoperiod (long and short day) of the first leaves, in plants from ordinary and vernalized seeds may serve as a sufficiently accurate criterion of the length of the vernalization stage of different varieties of wheat.—R.P.J.

664 PANELLA, A. I raccolti di frumento al campo sperimentale di Perugia in rapporto alla introduzione e alla sospensione delle concimazioni minerali. [**Wheat yield in the experimental field of Perugia, Italy, in relation to the introduction and suspension of chemical manuring.**] *Ann. Fac. Agr. Univ. Perugia* 1949, **6**, pp. 13, bibl. 8. [Ist. Agron. Univ. Perugia]

Trials were carried out from 1939 to 1948 with the 2 following rotations of 5 and 4 years respectively : (a) maize/wheat with lucerne/lucerne 2 years/wheat, and (b) maize/wheat with clover/clover/wheat. Each rotation was repeated on 4 plots of about 50 sq.m. each. The first plot of each rotation had received NPK manuring for many years, the second had never received chemical fertilizers, in the third manuring started in 1939 and in the fourth it was stopped this year. The following conclusions were drawn : (a) chemical manuring increased the wheat yield considerably ; (b) when manuring was suspended, the wheat yield decreased from that time ; (c) when chemical manuring was given to a plot which had never been so treated before, the wheat yield in a few years reached the same level as in plots manured for a long time ; (d) there was only a slight difference between the wheat yield from the two rotations.—E.B.

OAT

665 CANADA. Department of Agriculture, National Research Council, Associate Committee on Plant Breeding. **Report on cooperative tests of oat varieties 1950.** [n.d.], pp. 29. [Mimeographed]

Data are presented of tests at 17 locations of the following oat varieties: Victory, Vanguard, Ajax, Exeter, Garry, Lanark, Andrew, Zephyr, two R.L. 1574 × Ajax crosses, seven R.L. 1574 × Roxton crosses, three Garry selections, one Ajax selection, 3003-S15 (Onward-Anthony × Bond cross), and three Vanguard × Erban crosses.—P.J.B.

666 Illinois Agricultural Experiment Station. Circ. 659. **Spring oats for Illinois. Variety trials 1945-1949. Disease hazards 1949.** By *J. W. Pendleton* and others. 1950, pp. 8.

Varietal recommendations are made for northern, central and southern Illinois. The varieties recommended include: Clinton, Andrew, Bonda, Marion, Benton, Mindo and Columbia.—P.J.B.

667 Bartley, B. G., and Weiss, M. G. **Evaluation of physical factors affecting quality of oat varieties from Bond parentage.** *Agron. J.* 1951, **43**, 22-5, bibl. 12. [Iowa Agric. Expt Sta., Ames, Iowa]

Data are given of the mean weight per bu., hull-percentage, percentage of primary kernels and kernel-weight of 19 varieties of oats derived from crosses in which one parent was Bond, and 4 other varieties grown during 1947 and 1948 at: Fargo, North Dakota; Madison, Wisconsin; Ames and Kanawha, Iowa. Among Bond-derived varieties, Eaton was significantly lower and Mindo, Bonda and Zephyr significantly higher in hull-percentage than Clinton. On the basis of hull-percentage, Benton, Andrew, Advance, Sac and Colo were of higher quality than Clinton. Among early varieties, there was a significant negative correlation between hull-percentage and kernel-weight and between hull-percentage and yield; this did not hold good for mid-season varieties. Weight per bu. was positively correlated with kernel-weight and yield and the characteristics of primary kernels were closely associated with those of the secondary kernels. The ranking of varieties was fairly consistent at all test locations.—P.J.B.

668 Huttunen, E. Sisukara. [**Sisu oats.**] *Siemenjulkaisu* 1950, 121-6, English summary, pp. 125-6. [Plant Breed. Sta., Tammisto, Finland]

The Sisu oat originated in the cross Vasa (White Banner) × Tammisto strain 02272. It ripens at the same time as Svalöf Golden Rain II, very generally grown in Finland, and is therefore particularly suitable in the southern and south-western areas of he country. In field tests Sisu has given high yields. t has been included in the principal test for 9 ummers, and has surpassed Golden Rain II in yield. It is also outstanding in comparison with more recent Scandinavian varieties, none of which produces higher yields than Sisu. The straw of Sisu is fairly resistant to lodging. The grain was first marketed in 1948, and is at present among the most widely grown oats. The crop is not sensitive to drought and gives satisfactory yields in unfavourable conditions. Sisu is considered the best oat variety released by Tammisto.—From author's summary.

669 Tennberg, F. Eho-, Sisu- ja Sol II-kaurat paikalliskokeissa. [**Eho, Sisu and Sol II oats in local tests.**] *Siemenjulkaisu* 1950, 136-46, English summary, pp. 145-6. [Tammisto Plant Breed. Sta., Finland]

The Swedish Golden Rain II oat has, for about 20 years, been the variety most grown in Finland as far north as Central Finland. The other oat varieties reported on in the present article are all new to Finnish agriculture. The variety, Eho, produced by the Tammisto Plant Breeding Station, was released for sale in 1946. It was intended mainly for production in Central Finland, where Golden Rain oat, because of its late ripening, is uncertain. Sisu oat is also a Tammisto variety, released for sale in 1948. It gives excellent results. The Svalöf variety Sol II was imported into Finland during the post-war years, when a shortage of oat seed prevailed. An oat of hard straw and good yield, it has spread in South Finland, although it is slightly later than Golden Rain.—From author's summary.

670 Pfeiffer, R. Hafersortenfrage und Resistenzzüchtung im Alpenraum. [**The problem of oat varieties and breeding for resistance in alpine regions.**] *Bodenkultur* 1950, **4**, 166-85, bibl. 33. [Bundesanstalt für alpine Landwirtschaft, Admont, Austria]

From 1936 onwards there has been a marked and steady reduction in the area devoted to oat cultivation in the alpine regions of Austria. (Vorarlberg is an exception.) This is largely due to the prevalence of black rust (*Puccinia graminis*) and frit flea (*Oscinis* sp.) which result in uneconomical returns. Rust is controlled by eradicating the barberry and by cultivating early-ripening varieties. Chemicals as dusts or sprays have proved to be impracticable. The most promising line of control against both rust and frit flea is the breeding of resistant varieties. An account of breeding methods is given.—D.B.

671 Henry, A., and others. **Control of covered smut of oats by seed treatment with an antibiotic.** *Science* 1951, **113**, 390, bibl. 4. [Plant Sci. Dept, Alberta Univ., Edmonton, Alta, Canada]

Experiments were carried out with streptomycin and actidione for the control of *Ustilago kolleri* in oats, wheat and barley seed. With oats, seed treatment with 10 p.p.m of actidione in water gave almost complete control of the pathogen, while treatment with 1000 p.p.m of streptomycin in water was ineffective. With barley, treatment with 10 p.p.m of actidione significantly reduced infection with covered smut. In the case of oats and barley, the treatment did not impair seed germination. With wheat, both streptomycin and actidione caused significant reductions in germination. Data are given which show that actidione compared favourably with Ceresan M, Panogen 8 and formaldehyde as seed treatments for this pathogen. Actidione is considered of sufficient promise to warrant further investigation as a seed treatment.—P.J.B.

RYE

672 Wynd, F. L., and Noggle, G. R. **Chemical composition of rye grown on different soil types in Ontario, Canada. 6. Ascorbic acid content of the plants.** *Lloydia* 1950, **13**, 183-90, bibl. 10. [Bot. and Plant Path. Dept, Michigan State Coll., East Lansing]

Determinations were made of the ascorbic acid content of two successive cuttings of immature rye grown on five markedly different soil types. The ascorbic acid content of the plants was compared with the chemical characteristics of the soils. Positive relationships were noted between the ascorbic acid content of the rye and the total and organic base exchange capacity, the total replaceable bases, organic matter, N content, replaceable Ca and Mg, and the P_2 and P_4 phosphorus fractions of the soils. The ascorbic acid content of the first cutting was markedly higher than that of the second. Negative correlations were observed in the case of the degree of base saturation and the P_1 phosphorus fraction of the soils. The above correlations were only evident when the data from the two cuttings were grouped separately; consistently negative correlations were only noted in the case of the pH value and the P_2 phosphorus fraction of the soils. High soil pH values were associated with low ascorbic acid content of the rye.—P.J.B.

673 Wynd, F. L., and Noggle, G. R. **Chemical composition of rye grown on different soil types in Ontario, Canada. 7. Relationships between concentrations of ascorbic acid and other components in the plant.** *Lloydia* 1950, **13**, 191-5, bibl. 7. [Bot. and Plant Path. Dept, Michigan State Coll., East Lansing]

Determinations were made of the correlation between the ascorbic acid and the N, Ca, Mg, K, Fe and P content of rye grown on five different soil types and clipped twice successively at, or just before, the jointing stage. The ascorbic acid content of the rye was positively related to the N, Ca, Mg and Fe content. In the case of the K content of the rye there was no consistent relationship, but in the case of the P content, there was an inconclusive, and generally negative, correlation. The ascorbic acid content of the second clipping of the rye was markedly lower than that of the first, but this change was not associated with any corresponding change in the above-mentioned tissue components, with the possible exception of P.—P.J.B.

BARLEY

674 Klitsch, C. Die Wintergerste. [**Winter barley.**] *Dtsch. Landw.* 1950, **4**, 1-10. [Jena]

The original parent of the strains of winter barley at present cultivated in Germany was probably a 6-rowed, summer annual, wild barley. A knowledge of the origin of the crop is important for understanding the best methods of cultivation and for realizing the crop's potentialities. Climatic requirements, place in rotation, tillage and seed-bed preparation (for which barley makes much higher demands than wheat), manuring, and choice of seed are discussed as they apply to conditions in Germany. Winter barley is compared with other cereals as regards its yields (which are higher), and its place in animal feeding. (See also next abstract.)—D.B.

675 Klitsch, C. Die Wintergerste. [**Winter barley.**] *Dtsch. Landw.* 1950, **4**, 36-9. [Jena]

[See previous abstract.] This article concludes the former one by adding information on rolling, hoeing, weeding, harvesting and yields. The worst weeds of winter barley are *Centaurea cyanus*, *Papaver* sp, and *Agrostis spica-venti*. They can be kept under control by nitrochalk applied at 100 to 150 kg./ha. The correct time for cutting the crop is at the golden stage, not before, or after. At this stage, ears do not break and the grain does not fall out, a failing which not only reduces yields but also causes trouble with the subsequent crop especially if this is lucerne. Yields of 24 to 28 q./ha. are not worth the cultivating. Medium yields amount to 32 to 36 q./ha. and good yields can reach 40 to 50 q./ha. The proportion of grain to straw is 1 : 1.4. Winter barley, though difficult to grow, is well worth the effort.—D.B.

676 Wilten, W. Oogstmethodenproeven, 1949. [**Experiments with methods of drying barley in the field, 1949.**] *Fourteenth NaCoBrouw Yearbook* 1950, 30-4.

Trials were carried out at a number of locations in the Netherlands in 1949 to determine the best method of stooking barley in the field to preserve its malting quality. The following methods were compared: stooks of 10 sheaves placed one against the other in pairs; similar stooks, with two sheaves used as a cover; 27 sheaves mounted on a tripod, with four used as a cover; stacks of 20 sheaves placed upright in a circle on the ground, on top of which 17 sheaves were placed with their heads turned in and a cover of 4 sheaves on top. The tripod method gave the best grain colour, though stacking also gave good results. There was no discernible difference between the malting quality of the stooked and stacked barley, a not surprising fact in view of the exceptionally good weather during the trials. The trials were continued in 1950.—P.J.B.

677 ILLINOIS Agricultural Experiment Station. Circ. 641. **Spring barley. Varieties and culture.** By *J. W. Pendleton* and others. 1949, pp. 4.

678 NORTH CAROLINA Agricultural Experiment Station. Spec. Circ. No. 9. **Colonial barley.** By *G. K. Middleton* and *T. T. Hebert*. 1950, pp. 8.

Colonial barley is derived from a cross between Davidson × Sunrise 2989. It has a wide range of adaptation, gives good yields and is resistant to some of the local races of powdery mildew and leaf rust. The straw is short and stiff and is well adapted for combining.—K.O.

679 WILTEN, W. De veldproeven in 1949. [**Trials with spring barley in 1949**] *Fourteenth NaCoBrouw Yearbook* 1950, pp. 88-98.

The results of yield trials at two locations in Holland with 19 varieties of malting barley are reported. At Nordgouwe and Westmaas, Herta gave the highest yields, with 59.7 and 61.9 kg. per acre, followed by Weibull's 4994, with 58.1 and 61.9, and Haisa Neu with 57.1 and 57.1 kg. per acre. The malting quality of Haisa Neu appeared to be very good, whilst that of Herta and Weibull's 4994 was not entirely satisfactory. In other field trials at Westmaas, Herta again gave the highest yield, with 57.7 kg. per acre, followed by Balder with 53.3, Carlsberg with 52.6, Kenia with 48.7 and Aurore with 47.9 kg. per acre. Analyses are given of Kenia, Balder, Carlsberg and Herta grown at three locations, and also the results to date from trials to determine the latest date of application of N dressings to spring barley commensurate with good malting quality of the grain.—P.J.B.

680 SELSJORD, I. Byggsorter for fjellbygdene. [**Varieties of barley for mountain areas.**] *Norsk Landbr.* 1951, **17**, 141-3. [Statens Forsøksgd., Løken, Opland, Norway]

Data are given of trials at Løken during 1947 to 1950 to compare the standard variety Maskin with 8 other varieties. At Løken, Dørum 1185 gave the highest yield, with 24 kg. per dekar (.247 acre) above that of Maskin, followed by M × Kj 573 (Maskin × Kjevik selection) 23 kg. more than Maskin, Edda 15 kg., Varde 13 and Jotun 6 kg. more, and Sølen 12 kg. per dekar less than Maskin. In trials at outlying districts near Løken, M × Kj 573 yielded 63 kg. per dekar more than Maskin, followed by Varde 44 kg., Edda 40 and J x 0602 11 kg. per dekar more than Maskin. Jotun and Sølen yielded 5 and 20 kg. per dekar less than Maskin. Sølen and Fløya were the earliest varieties tested. Varde had the lowest lodging percentage. Maskin had the highest 1000-grain weight, with 41.9 grm. followed by Fløya 38.9 and Varde, 38.5 grm. Brief notes are given of Maskin, Varde, Jotun, Sølen, Floya, Edda, Dørum 1185 and M x Kj 573.—P.J.B.

681 BRÜCHER, H., and ÅBERG, E. Die Primitiv-Gersten des Hochlands von Tibet, ihre Bedeutung für die Züchtung und das Verständnis des Ursprungs und der Klassifizierung der Gersten. [**The primitive barleys of the Tibetan uplands and their importance in the study of the origins and classification of barleys and their value as breeding material.**] *Kungl. LantbrHögsk. Ann.* 1950, **17**, 246-319, bibl. 51, English summary, 316-7.

The paper is divided into two sections. Part 1 contains a report on studies of the morphology and taxonomic position of 2800 strains of *Hordeum vulgare* collected from Sikkim and southern Tibet. The distribution of indigenous varieties and wild types in the regions in which the collection was made was studied in detail and the discovery of a number of very primitive types of barley is considered to support the view that the south-eastern valleys of the Himalayas may be the region of origin of six-rowed barleys. A number of strains of naked barley in the collection are characterized by their extreme resistance to cold and by early ripening. Part 2 contains a discussion on the basis of the material presented in Part 1, of the rôle of Central Asia as the place of origin of cultivated barleys. The problems of the classification of barleys are reviewed.—P.J.B.

682 TAKAHASHI, R. **Studies on the classification and the geographical distribution of the Japanese barley varieties. I. Significance of the bimodal curve of the coleoptile length.** *Ber. Ōhara Inst. landw. Forsch.* 1942, **9**, 71-90, bibl. 19. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

683 MCKEE, H. S. **Studies on the nitrogen metabolism of the barley plant (*Hordeum sativum*).** *Aust. J. sci. Res.* Ser B, 1950, **3**, 474-86, bibl. 21, fig. 16. [C.S.I.R.O., Homebush, N.S.W.]

In detached barley leaves held at constant temperature in the dark, there was an increase in " soluble " and a corresponding decrease in " solid " nitrogen. In mature leaves, glutamine accumulated in the early stages of starvation and later decreased concurrently with an increase in asparagine. In detached seedling leaves, the glutamine content remained low throughout, the sequence of events otherwise resembled that found with mature leaves. Changes in the nitrogenous fractions during autolysis, in sterile conditions, of barley leaf tissue differed greatly from those found with intact detached leaves. "Soluble" nitrogen increased, but neither amide nor ammonia accumulated. In germinating seedlings, there was a considerable accumulation of asparagine. This accumulation was more marked in the dark than in the light, and in plants supplied with nitrogen as an ammonium salt than in those supplied with nitrate. Small amounts only of glutamine were found in seedlings.—Author's summary.

684 Jacobson, L., and others. **A study of potassium absorption by barley roots.** *Plant Physiol.* 1950, **25**, 639-47, bibl. 11. [College of Agric., Univ. Calif., Berkeley]

685 Takahashi, R. **List of literature on barley.** *Ber. Ōhara Inst. landw. Forsch.* 1943, **9**, 259-316, bibl. over 1300. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

MAIZE

686 Netherlands. Directie van de Landbouw. V.W.B. No. 6. De verbouw van maïs in Nederland. [**The cultivation of maize in the Netherlands.**] By *P. G. Meijers* and *W. R. Becker*. Wageningen, 1950, pp. 36.

The progress of maize grain production in the Netherlands over the last 20 years is reviewed and a brief account is given of the breeding and multiplication of hybrid maize. A table gives the yield, maturity class and grain type of the following varieties tested during 1946-48 and 1949 at Lunteren and Ede: Pioneer; Early Yellow Round C.B.; Wisconsin 240, 255, and 355; Amo (Wisconsin 240); Nodak 203; Pearl of Cornell; and Minnesota 800. In 1949, Wisconsin 355 and 255 headed the yield trials with 7020 and 6990 kg. per ha. of grain, respectively, followed by Minnesota 800, with 6020, and Pearl of Cornell (a cross-pollinated variety) with 5930 kg. per ha. Notes are given on the influence on crop yields of soil and climatic factors, manuring, cultivation, depth, method and time of sowing and seed row width. The harvesting, grain drying and storage, as well as the pests and diseases of maize are briefly reviewed. —P.J.B.

687 Crocioni, A. Rilievi sulla consociazione della patata con girasole e granoturco e sulle reciproche influenze fra le piante consociate. [**Note on the intercropping of potato with sunflower and maize and the reciprocal influence between these crops.**] *Ann. Sper. agr.* 1951, **5**, 441-51, bibl. 1, English summary p. 451. [Ist. Agron. Univ. Bologna, Italy]

The intercropping of potato with sunflower and of potato with maize, var. Marano Vicentino, was studied in 1950 at the experimental farm of Corticella. The 3 crops were sown on the 6th and 7th April on rich soil. The spring and summer of 1950 were exceptionally dry. The intercropping of potato with sunflower was successful; the sunflower yielded a heavier crop than when grown alone. The intercropping of potato with maize was unsuccessful as regard the maize, which yielded less grain and had smaller plants than the control crop grown alone.—E.B.

688 Haskell, G. **Hybrid corn** [**maize**] **in theory and practice.** London, 1949, pp. 23, bibl. 28. [Received 1951] [John Innes Hort. Inst.]

This is the substance of a lecture given at a meeting of the British Association for the Advancement of Science, Brighton, 10th September, 1948. The methods of maize breeding followed in the USA are described, and brief reference is made to the work carried out at the John Innes Institute with a view to obtaining maize varieties adapted to conditions in England.—E.B.

689 Boceta, V. Siete años de trabajos selectivos en maices. [**Seven years' selection work on maize.**] *Bol. Inst. Invest. agron.* 1950, **10**, 107-57, bibl. 36, French and English summaries pp. 153-6. [Centro de Cerealicult., Madrid]

690 Buys, A. C. De keuring van hybridemaïs. [**Inspecting hybrid maize.**] *Landbouwk. Tijdschr.* 1950, **62**, 761-4. [Netherlands Gen. Inspection Service, Wageningen]

Maize seed cultures under inspection comprise, (a) those devoted to the maintenance and reproduction of recognized, bred varieties, and (b) hybrids already officially recognized or under investigation. Field inspection takes place at least three times during the flowering season. Precautions required for the maintenance of racial purity are outlined. Harvested seed is also inspected, and the advisability of drying maize seed directly after harvesting, unthreshed, at a low temperature, has been demonstrated. Some germination test methods are discussed.—G.M.R.

691 Fenaroli, L. Mais ibridi prodotti in Italia. [**Hybrid maize varieties produced in Italy.**] *Ital. agric.* 1951, **88**, 77-84, bibl. in text. [Sta. sper. Maiscolt. Bergamo, Italy]

The production of commercial seed of the hybrid varieties Insubria 156 and Insubria 2201, both bred at the above station, started in 1950. These 2 varieties are earlier than Insubria 1 and Insubria 2. Insubria 156, a yellow dent with a vegetative cycle of 133 days, has the same parentage as Iowa 4316 of the USA which has performed well in Italy in recent years. It is recommended for irrigated land in the plain, and also for non-irrigated, cool soils in northern Italy, Tuscany and Marche. Insubria 2201, an orange flint with a vegetative cycle of 120 to 125 days, bred from the best Italian polenta varieties, is the first hybrid maize derived entirely in Italy. It yields, on an average, 25% more than the varieties from which it originated. It is recommended for irrigated and dry land in Lombardy.—E.B.

692 FENAROLI, L. Criteri di scelta del mais ibrido. [**Criteria for choosing hybrid maize varieties.**] *G. Agric. Domen.* 1951, **61**, 91. [Sta. sper. Maiscolt., Bergamo, Italy]

Instructions are given to farmers for growing hybrid maize. A list is given of hybrid varieties with notes on the length of their vegetative cycle and on suitable environments and districts for cultivating them in Italy.—E.B.

693 ILLINOIS Agricultural Experiment Station. Bull. 543. **Experimental corn hybrids. 1950 tests.** By *L. F. Bauman* and others. 1951, p. 99.

694 ILLINOIS Agricultural Experiment Station. Bull. 544. **1950 Illinois tests of corn hybrids in wide use.** By *J. W. Pendleton* and others. 1951, pp. 136.

695 SOUTH DAKOTA Agricultural Experiment Station. Circ. 79. **1949 South Dakota corn performance tests.** By *D. B. Shank.* 1950, pp. 14.

696 RUSH, G. E., and NEAL, N. P. **The effect of maturity and other factors on stands of corn at low temperatures.** *Agron. J.* 1951, **43**, 112-6, bibl. 12. [Wisconsin Agric. Expt Sta., Madison]

Studies were carried out to determine the effect on maize stands of : (1) degree of maturity of the seed, (2) frost exposure prior to seed harvest, (3) seed-coat injury sustained during mechanical harvesting. The seed of 5 Wisconsin hybrids of 90 to 115 relative maturity were harvested at 10-day intervals at Madison, Wisconsin, beginning on the 30th August. The seed was dried, sown in pans of moist soil and cold-treated, by being kept at 10°C. for 14 days. The pans were removed after this period to a room at 20°C. for seedling emergence observations. All the seed harvested after the first harvest date had a high germination percentage in standard laboratory tests. Large differences in germination and stand were noted between seed harvested at 10-day intervals and germinated following the cold soil treatment. In general, stands improved as the maturity of the seed increased. In all cases, seed treatment with Arasan gave better stands than where seed treatment was omitted. The germination and stands of seed harvested after a frost were significantly lower following the cold soil treatment than in the case of unfrosted seed. Seed-coat injury did not appear to be a major factor influencing seed germination and stands. The results indicated that frost injury and the maturity of seed were important factors in determining the stands of maize where the seed is subject to conditions of low soil temperature.—P.J.B.

697 PURDUE UNIVERSITY Agricultural Experiment Station. Sta. Circ. 359. **Diseases of dent corn in Indiana.** By *A. J. Ullstrup.* 1950, pp. 27.

698 OWENS, R. G., and ELLIS, D. E. **The efficacy of certain chemical soil treatments against meadow nematodes.** *Phytopathology* 1950, **41**, 123-6, bibl. 9. [Bot. Dept, N. Carolina Agric. Expt Sta., Raleigh, N.C.]

Pot experiments were carried out on maize grown in *Pratylenchus*-infested soil, to determine the value of : (1) dichloropropene-dichloropropane mixture ; (2) chloropicrin ; (3) ethylene dibromide, for the control of *Pratylenchus* spp. Rates of nematocide applications were 200, 400 and 600 lb. per ac. with all the nematocides. The 200 lb. per ac. treatment markedly reduced *Pratylenchus* numbers, but did not prevent reinfestation within 90 days after treatment. At rates of 400 and 600 lb. per ac. nematocides (1) and (2) were much more effective than at the 200 lb. per ac. rate ; but (3) was no more effective at 400 and 600 lb., than at 200 lb. per ac.—P.J.B.

699 TONINI, G. Il ciclo del granoturco. [**The vegetative cycle of maize.**] *G. Agric. Domen.* 1951, **61**, 142.

700 REEVES, R. G. **Morphology of the ear and tassel of maize.** *Amer. J. Bot.* 1950, **37**, 697-704, bibl. 15. [Texas Agric. Expt Sta., College Station]

The author states with emphasis that the present report considers only a small portion of a broader problem the object of which is to find evidence concerning the characteristics of the wild prototype of modern maize. The method described for studying the anatomy of the ear of *Zea mays* proved to be uniformly successful. Ears of young plants growing in the field were covered with bags before the silks appeared so as to prevent pollination and fertilization. The ears developed to approximately normal size but only the vascular system became lignified. Ear rotting fungi (not identified) were then allowed to dissolve the cellulose tissues, and the vascular skeleton remained. The anatomy of the ear is described in some detail since the method has disclosed a number of features not previously reported. The description is given under the following headings: morphology of the rachis segment; arrangement of rachis segments; the vascular system (axial and peripheral); and abnormal ears. The possible bearing of the anatomy of the maize ear on the theory of the origin of polystichy by lateral fusion of lesser spikes has been considered. The evidence fails to support the theory.—D.B.

701 Tonini, G. La pianta di mais ed il suo peso frazionato. [**The weight of different parts of the maize plant.**] *Ital. agric.* 1951, **88**, 136-7.
An investigation was carried out in 1943, 1948 and 1950 with 3 maize varieties of different height and different vegetative cycles; namely Quarantino, early, spacing 5.5 plants per sq. m.; Marano Vicentino, spacing 4 plants per sq. m.; and Pfister, late, 3 plants per sq. m. A hundred and fifty plants of each variety were examined each year and the average weight of the various parts of the plant was calculated.—E.B.

702 Le Conte, J. Sélection généalogique du maïs et production de semence hybride. [**Genealogical selection of maize and production of hybrid seed.**] *Agron. trop.* 1951, **6**, 43-54, bibl. 8.
A summary is given of the information collected by the author in the USA during a mission to study the methods of maize selection in that country, with a view to introducing these methods in the Union of Indo-China, particularly in Cambodia.—E.B.

703 Wright, J. E., and Srb, A. M. **Inhibition of growth in maize embryos by canavanine and its reversal.** *Bot. Gaz.* 1950, **112**, 52-6, bibl. 9. [Pennsylvania State College, State College]
Excised immature embryos of *Zea mays* were used for the experiment. Canavanine, at the rate of 20 mg./l., effectively inhibited the growth of 24-day old embryos. The inhibition can be reversed by the addition of arginine or certain other amino acids (citrulline, ornithine, glutamic acid and lysine).—D.B.

704 Frey, K. J. **The inter-relationships of proteins and amino acids in corn** [*Zea mays*]. *Cer. Chem.* 1951, **28**, 123-32, bibl. 19. [Iowa Agric. Expt Sta., Ames]
The grain of the F_2 generation and backcrosses of two maize crosses was analyzed for total protein, zein, tryptophane, valine, leucine and isoleucine content. The zein and leucine content increased and the tryptophane and valine content decreased as the protein content of the samples increased. It was deduced that the protein of high-protein grain was of lower value, weight for weight, than that of low-protein grain. The total protein and tryptophane content of grain from crossed strains was significantly lower than that of selfed strains, grown on the same ear.—P.J.B.

705 Eyster, H. C. **Catalase activity in chloroplast pigment deficient types of corn.** *Plant Physiol.* 1950, **25**, 630-8, bibl. 5. [The Charles F. Kettering Foundation, Yellow Springs, Ohio]

706 Novilov, V. A., and Barannikova, Z. D. [**The critical period in maize in relation to the intensity of light.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **76**, 937-40, bibl. 8. [Leningrad Agric. Inst.]
Results of pot experiments in 1950 with maize of the Leningrad variety in which the plants were shaded at different dates, indicated that in maize, as in wheat, oats and barley, there occurs a critical period in relation to the intensity of light, beginning at the time of the formation of the tetrad of the pollen mother cells and continuing for about 8 to 10 days. Owing to the weaker illumination during this period, the plants were unable to develop normal male inflorescences with normal pollen. In most cases no pollen was formed. The female inflorescences suffered the most injury when the plants were shaded at a later period (11th to 19th August).—R.P.J.

707 Miller, E. V., and others. **Population density of unirrigated maize and its influence upon fertilizer efficiency in central Mexico.** *Proc. Soil. Sci. Soc. Amer.* 1949, **14**, 270-5, bibl. 7. [Oficina de Estud. Esp., Sec. de Agric. y Ganadería, Mexico, D.F.]
The investigations reported were designed to explore methods of increasing maize yields at a number of different sites in central Mexico by the use of light applications of fertilizer and the combination of high plant densities with relatively heavier applications of fertilizer. The maize plant population densities over the areas studied varied between 8000 and 20,000 plants per acre, with the higher densities occurring in cool mountain areas. Fertilizer response was closely related to the adequacy of rainfall; a monthly total of less than 4 in. in August or 3 in. in September seriously reduced maize yields and fertilizer response. Applications of 17.8 lb. N per acre as sulphate of ammonia proved the most efficient fertilizer rate; applications of 35.6 lb. N per acre were much less efficient than the 17.8 lb. per acre rate, unless accompanied by phosphorus. Fertilizers, particularly NP applications, increased stand densities. The optimum stand densities per acre with fertilizers were 20,000 and over on humid sites, 16,000-20,000 on

intermediate rainfall sites and 12,000-16,000 on drought-affected sites. Among the improved varieties used in the trials, Rocamex V-21 was relatively tolerant to wide variations in plant density, but other varieties such as Criollo, Rocamex H.307 and Celaya 2 required a correct stand density in relation to soil productivity.—P.J.B.

708 GRAND, R. Observations historiques sur l'origine du maïs. [**Historical observations on the origin of maize.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 700-3, bibl. 5.
[See *Fld Crop Abstr.* 3, Abs. 289]

709 ALMEIDA ALVES, J de. O milho na engorda do porco. **Maize in pig fattening.**] *Melhoramento* 1950, **3**, 5-30, bibl. 17, English summary, p. 29. [Lab. Química, Esta. Melhoramento de Plantas, Elvas, Portugal]

710 POLDERMAN, B. De mogelijkheden van de teelt van maïs in Nederland. [**Maize growing prospects in the Netherlands.**] *Landbouwk. Tijdschr.* 1950, **62**, 740-53. [Netherlands Heath Assoc.]

An account is given of the history and prospects of maize growing in the Netherlands, of cultural technique, costs, and the measures now being taken to promote the cultivation of this crop. The last-named include, besides experimental work at home and study tours abroad, the improvement of seed supplies, the strict inspection of hybrid maize cultures, and subsidies to encourage farmers to test this relatively new crop.—G.M.R.

MILLET AND SORGHUM

711 MUSIL, A. F. **Some brief notes on the identification of seeds of foxtail millet (*Setaria italica*).** *Proc. Assoc. Off. Seed Anal. N. Amer.* 1950, 55-7, bibl. 1.

712 JACKSON, B. B. **Studies in the varietal determination of German and Common millet.** *Proc. Assoc. Off. Seed Anal. N. Amer.* 1950, 57-8. [State Dept Agric., Richmond, Va]

In areas where foxtail millet (*Setaria italica*) is commonly grown in the USA, it has become apparent that there no longer exists a pure type of German millet, but that all commercial stocks have become mixtures of the German and Common varieties. The crops produced from these mixtures, however, are consistently large-headed and give satisfactory yields.—P.J.B.

713 GOVANDE, G. K. **Improved varieties of pulses and lesser millets for Gujerat.** *Indian Fmg* 1950, **11**, 194-6.

Improved varieties of pulses and lesser millets were studied at Baroda and Jagudan Experimental Stations. The best varieties were: *Phaseolus aconitifolius*, Baleswar 12 and Medhi 33; *Cyamopsis psoraloides*, Malosan 40; *Paspalum scrobiculatum*, Baraoda 8 and Baroda 15; *Eleusine coracana*, Jagudan 44.—N.G.S.

714 LANZA, F. Osservazioni agro-chimiche sul *Sorghum saccharatum* "Sugar" selezione Parisi. [**Agro-chemical observations on *Sorghum saccharatum* var. Sugar selected by Parisi.**] *Agricoltura nuova* 1950, **2**, pp. 8, bibl. 3. [Sta. chim.-agr. sper., Roma.]

There has been considerable difference of opinion regarding the value of sweet sorghum in Italy. In the trial described the variety Sugar, 150 days, was grown under irrigation on a plot of 80 sq. m. The highest sugar content in the stems was found a few days before the milk-ripe stage. Harvesting took place on 14th October at a more advanced stage of ripening. The stem yield (88 % moisture) was 458 q./ha., the total sugar yield (0.8 % glucose + fructose and 3.23 % sucrose) 18.4 q./ha., and the grain yield 50 q./ha. This crop has the disadvantage of occupying the soil until late in the season, so that autumn wheat cannot follow it, and of requiring deep cultivation to free the soil from its roots.—E.B.

715 ARKANSAS Agricultural Experiment Station. Rep. Ser. 17. **Sorghum yield tests 1937-49.** By *W. J. Wiser.* 1950, pp. 20.

General recommendations are given for successful sorghum growing in the State. Grain and green forage yields, and a list of varieties, are included.—K.O.

RICE

716 UNITED STATES Department of Agriculture. Fmrs' Bull. No. 2022. **Rice culture in California.** By *J. W. Jones* and others. 1950, pp. 32.

A detailed description is given of the climatic, soil, fertilizer, water and seed-bed requirements for rice cultivation in the State. Other aspects discussed include preparation of the land for irrigation and drainage, the varieties to grow, harvesting and the more important weed and insect pests of the crop.—K.O.

717 AGRONOMIE TROPICALE. Études agronomiques sur le riz au Soudan français effectuées par le Service agronomique de l'Office du Niger. [**Agronomic studies on rice in the French Sudan carried out by the agronomic service of the Niger Office.**] *Agron. trop.* 1950, **5**, 339-65 and 451-88.

An account is given of the studies carried out in connexion with the development of rice growing in the "Delta Central" of the Niger. These were concerned with: (a) varieties; (b) chemical and organic manuring; (c) water requirements; (d) weed control; (e) influence of harvesting date, harvesting method and moisture content of the paddy on the milling return. In the rice varieties of this region, the percentage of clean rice to paddy varies from 70-74. The principal varieties are: Bentoubala B, 145 days; Sikasso H, 150 days; and Sikasso B, 160 days. These 3 varieties, selected by the Kayo Station, are hardy and high-yielding. Dissi-N-14, 140 days, which yields less, is being abandoned, since the Maakada dam now allows for the irrigation of higher-yielding, later varieties. Sornavari, 110 days, is employed only when late varieties have failed. From the results of manuring trials it was concluded that N increases rice yields considerably. N can be supplied either by green manures (*Crotalaria retusa* and *C. striata* are grown for this purpose) or by N fertilizers. P and K fertilizers did not appear to influence yield. Effective weed control was obtained by the following procedure, which allows economy of seed and ensures good germination. Immediately after sowing, on dry land, the field should be flooded, and 6 to 10 cm. of water maintained during the whole sprouting period. In the following vegetative period the water should be 20 to 25 cm. high. This method can be employed only where the land has been levelled.—E.B.

718 INDIAN FARMING. **Improvement of paddy in Travancore.** *Indian Fmg* 1950, **11**, 238.

A brief popular account is given of research work carried out in Travancore-Cochin. It was found that sprouted rice seed could be kept for a period of 30 days, both in sun and shade, without detriment to its subsequent growth. The optimum seed rate for broadcasting the varieties MO. 1. and MO. 2 was found to be 90 lb. per acre.—N.G.S.

719 ALLEN, E. F. **Padi manurial and cultural trials in the 1949-50 season.** *Malay agric. J.* 1951, **34**, 13-26, bibl. 4.

The agronomic trials (other than varietal) carried out in the Federation of Malaya in the 1949-50 season are summarized. In wet padi manurial trials, no significant differences were observed in values between North African and Christmas Island rock phosphate, nor between Christmas Island rock phosphate, guano and chelop. Chelop is a traditional Malay method of making a sludge of calcined bones, mud and water, and dipping rice seedling roots therein before transplanting. Phosphate placement trials proved inconclusive. An application of mono-ammonium phosphate applied to wet padi 6 or 10 weeks after transplanting gave an increased yield over an application made 1 to 2 weeks after transplanting. The greatest yields of straw were obtained from an application made 6 weeks after transplanting. In sowing-method trials dry seed was shown to produce fewer germinated plants than soaked seed. At Kelantan, higher yields of wet padi followed bare fallowing than after cropping with a green manure or leaving the natural off-season growth. Wet cultivation followed by normal transplanting resulted in higher yields than from dry cultivation followed by flooding and subsequent transplanting. In transplanting experiments, the youngest seedlings gave highest yields in short-term varieties, but with longer maturing varieties the seedlings transplanted at an older stage gave equally good results. Deep ploughing for dry padi, both late and at the normal time, gave significantly higher yields than early deep ploughing, or shallow ploughing (early, normal, and late.) Off-season crops, with some manure, gave higher subsequent rice yields than digging in a green manure crop (without fertilizer), bare fallow, or off-season weed growth. The superiority of deep ploughing over shallow ploughing was more marked when accompanied with off-season crops or green manure.—N.G.S.

720 HARTLEY, C. W. S. **Establishment of new rice areas in Malaya.** *World Crops* 1951, **3**, 171-5, illus, bibl. 5.

721 PORTÈRES, R. Les races de riz à paddy glabre dans les centres de variation secondaire des Guyanes et des îles Philippines (*Oryza sativa* L.). [**The rice varieties with glabrous paddy in the centres of secondary variation of Guiana and the Philippine Islands.**] *Agron. trop.* 1950, **5**, 528-32, bibl. 4. [Muséum d'Histoire naturelle, Paris]

A general classification of the glabrous rice varieties, and a description of those of the Philippine Islands are given. There is a close affinity between the glabrous rice varieties of Guiana and those of the Philippine Islands. In central Africa the growing of certain glabrous varieties from Guiana is extending. In all countries where glabrous rices are grown, they are adapted to non-irrigated cultivation, the necessary water being supplied by rain, except in the USA where glabrous varieties are grown under irrigation.—E.B.

722 KONDŌ, M., and KASAHARA, Y. Feststellung der Sortenechtheit von enthülsten Reiskörnern. I. Phenolfuchsinfärbung. II. Phenol- und Paracresolfärbung. III. Jodjodkalifärbung. IV. Alkaliprüfung und Schluss. [**Determination of varietal purity of hulled rice grains. I. Staining with phenolfuchsine. II. Staining with phenol and paracresol. III. Staining with iodine in potassium iodine solution. IV. Alkali test and conclusion.**] *Ber. Ōhara Inst. landw. Forsch.* 1943,

9, 117-40, bibl. 9. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Chemical staining is more reliable than morphological characteristics in distinguishing varieties in seed. Phenolfuchsine stains in shades of red to purple according to the variety of *Oryza sativa*. The seed coat takes up the stain while white polished rice remains unstained. Phenolfuchsine is a reliable guide so long as the rice grains are of the same age after harvesting. In the case of paracresol, unhulled as well as hulled rice seed was examined. Glumes stained dark brown and the grain light brown. The distinction between varieties is often difficult to detect. Paracresol reacts on an oxidase in the glume. A solution of iodine in potassium iodide stains black either all over the grain or in special areas. The corrosive action of potassium hydroxide varies according to the variety of the rice, a result of the different degree of permeability of the seedcoat and the varying nature of starch grains in different varieties.—D.B.

723 Nisikado, Y., and Nakayama, T. **The disinfection of rice seeds affected by *Helminthosporium oryzae*, with special reference to the hot water treatments.** *Ber. Ōhara Inst. landw. Forsch.* 1943, **9**, 214-29, bibl. 14. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

724 Grist, D. H. **The manuring of rice.** *World Crops* 1951, **3**, 131-2.

A summary of existing knowledge concerning rice manurial practices.—N.G.S.

725 Texas Agricultural Experiment Station. **Manurial treatments for rice.** *Agric. Res. in Texas*, 1947-49, 1950, pp. 64-5.

In trials, N only gave marked increases in rice yields on heavy soils, but P also gave yield increases on lighter soils. Applications of N at the time of sowing gave higher yields than later applications. Applications of ammonium sulphate and cyanamide as top-dressings at 300 lb. per ac. on dry soil gave a grain yield of 2735 lb. per ac.; on wet soil the yield was 2625, while on flooded fields, the yield was 1822 lb. per ac. Untreated plots yielded 1624 lb. per ac. Uramon, ammonium sulphate, cyanamide, ammonium nitrate and nitrate of soda were used to provide 60 lb. per ac. of N. Grain yields were highest following Uramon applications, with 2987 lb. per ac., followed by ammonium sulphate, with 2907 and cyanamide with 2844 lb. per ac. Untreated plots yielded 1835 lb. per ac.—P.J.B.

726 Kondō, M., and Kasahara, Y. Alkaliprüfung der polierten Weissreiskörner. [**Alkali test of polished white rice grains.**] *Ber. Ōhara Inst. landw. Forsch.* 1943, **9**, 141-50, bibl. 4. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Reactions to potassium hydroxide are an indication of the taste and gluten content of cooked rice. They also show up the striking differences between Japanese and non-Japanese varieties.—D.B.

OTHER

727 Portères, R. Une céréale mineure cultivée dans l'ouest africain. *Brachiaria deflexa* C. E. Hubbard var. *sativa* nov. var.). [**A minor cereal cultivated in West Africa (*Brachiaria deflexa* var. *sativa*).**] *Agron. trop.* 1951, **6**, 38-42, figs. 2, pl. 1. [Muséum d'Histoire Naturelle, Paris]

The grain of *Brachiaria deflexa* and of several other wild species of *Brachiaria* is often collected in tropical countries. *B. deflexa* var. *sativa*, a plant well differentiated from the normal type of the species, is grown in the Fouta Jalon, near Labe, French Guinea, where it is considered wrongly to be a variety of *Digitaria exilis*. Under primitive, local cultural methods it yields 600 to 800 kg. of grain per ha. It grows 1 m. high and gives an excellent hay. A botanical description of this plant is given.—E.B.

GENERAL

728 Lähde, V. Kevätviljojen satoisuussuhteista. [**The relative yields of oats, barley and spring wheat.**] *Valt. Maatalous. Tiedon.* 1950, 3-26, bibl. 16. English summary, pp. 24-6. [Agric. Res. Centre, Dept Pl. Husb., Tikkurila, Finland]

Comparisons of the yields obtained from these crops during the period 1930-46 are discussed, with special reference to soil conditions, length of the growing period (depending on latitude), rainfall, and the economics of producing the crops for human use or for stock feed.—M.H.

729 Opitz. Zur Beurteilung des Tiefumpflanzverfahrens. [**Criticism of deep transplanting (of cereals).**] *Dtsch. Landw.* 1948, **2**, 38-40. [Received 1950] [Inst. Acker- und Pflanzenbau, Univ. Berlin]

730 South Africa, Department of Agriculture, Stellenbosch-Elsenburg. Sci. Bull. No. 289. **Investigations of cereal diseases in the Western Cape Province. Fungus load of wheat samples from the Western Cape Province with reference to the possible spread of the causal organism of foot and root rot in seed wheat.** By *O. N. Oelofsen*, 1950, pp. 17, figs. 5. [Stellenbosch-Elsenburg Coll. Agric.]

The results of this investigation show that wheat seed is of minor importance in the spread of foot and root rot diseases in wheat due to *Ophiobolus graminis* and *Fusarium* spp. The disinfection of wheat seed by the recognised seed disinfectants will therefore probably have no effect at all, or at any rate only a slight effect, on the occurrence of these diseases.—From Author's summary.

731 Urries, M. J. de. Las royas de los cereales. [**The cereal rusts.**] *Bol. Inst. Invest. agron.* 1950, **10**, 397-475, bibl. 169. English and French summaries pp. 466-7.

A summary is given of present knowledge on cereal rusts. Among the points considered are: methods of evaluating the intensity of the attack and the resulting crop losses, factors affecting the development of the disease, and plant resistance. Certain fungicides are effective for rust control, but they are expensive and difficult to apply. The importance of obtaining rust-resistant varieties is stressed.—E.B.

732 Jameson, H. R., and Callan, I. W. McC. **Effect of gamma-BHC seed dressings on the germination of cereals.** *Nature, Lond.* 1951, **167**, 490. [Hawthorndale Labs, ICI Ltd., Bracknell, Berks.]

During the development of the combined fungicidal/insecticidal seed dressing ' Mergamma ', containing organomercurial and gamma benzene hexachloride, it became apparent that levels of gamma benzene hexachloride on the seed, safe in practical tests in the field and in box tests in soil, were markedly phytotoxic in conventional germination tests in sand or on damp filter-paper. This communication gives a brief summary of an extensive programme of work on this aspect with wheat, barley and oats.—Extract.

733 Oka, H. **Studies on the fluorescence of cereal grains.** *Ber. Ōhara Inst. landw. Forsch.* 1942, **9**, 91-115, bibl. 84. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

734 Carroll, J. C., and Chung-Hua, L. P. **A comparison of the niacin and pantothenic acid content of certain grains grown under the same environmental conditions.** *Science* 1951, **113**, 211-2, bibl. 6. [Chem. Dept, Kent State Univ., Kent, Ohio]

Data are given of the niacin and pantothenic acid content of 2 maize hybrids, 4 wheat, 2 oat and 2 soyabean varieties. There was a wide variation in the niacin and pantothenic acid content of the cereal varieties, the differences being greater in the case of niacin. The niacin content varied widely between the maize, oat and soyabean varieties, but very little among the wheat varieties.—P.J.B.

735 Silva Wahnon, J. Palhas de cereais (trig cevada e aveia). [**Cereal straws (whea barley, and oats).**] *Melhoramento* 1950, 31-75, bibl. 7, English summary, pp. 74- [Lab. Químico-Agric, Rebelo da Silva Portugal]

Analyses were made of the straws of *Triticum vu gare, T. turgidum, T. durum, Hordeum vulgare, H distichum, Avena sativa* and *A. byzantina.* In al some forty-one varieties were studied. It is con cluded that oat straw is the most nutritive, tha hard wheat straw is more nutritive than soft whea straw, and that all contain little digestible protein —N.G.S.

736 Swanson, C. L. W. **Fertiliser experiment and crop yields in Japan.** *World Crops* 1951 **3**, 133-7, bibl. 16.

Experimental plot size in Japan is generally eithe less than 1 sq.m., or else 15-25 m. × 1m. Nitroge is the most important fertiliser for irrigated anc upland rice; phosphorus and potassium also increase yields. Optimum applications per ha. fo rice are: N, 60-120 kg., P. 20-60 kg. and K. 40-80 kg. Nitrogen is also important on wheat, common barley, and naked barley, but phosphorus and potassium are less effective. Optimum application per ha. for these crops are: N. 80-120 kg., P. 40-8 kg. and K., 20-60 kg. Japanese experimental methods do not come up to modern standards elsewhere, but applied results have led to greatly increased yields. Increases in production per acre between 1882-1942 were: rice, 70 %; wheat, 140 %; common barley, 119 %; naked barley, 62%. Results in the USA over a similar period are compared and discussed.—N.G.S.

737 Edinburgh and East of Scotland College of Agriculture. Bull. No. 20. **The handling of grain from combine harvesters. The proceedings of a Conference of Farmers held in the Tait Hall, Kelso, Roxburghshire, on 12th Jan., 1950.** 1950, pp. 39.

See Abs 739.

738 Chartres, C. B. **Combining, drying, and handling grain on a Border farm.** *Edinburgh and East of Scotland Coll. Agric.* Bull. No. 20, 1950, pp. 23-34.

739 Williamson, W. F. **The technique of drying grain.** *Edinburgh and East of Scotland Coll. Agric.* Bull. No. 20, 1950, pp. 7-16.

The following methods of drying grain artificially are briefly described: (a) drying in shallow storage bins or silos; (b) drying in continuous-flow grain-driers; and (c) drying in sacks.—E.B.

740 Brockelsby, C. F. **An instrument for estimating the moisture content of grain and**

other materials by the measurement of electrical conductance. *Cer. Chem.* 1951, **28**, 83-94, bibl. 3.

741 ÅBERG, E. **Barley and wheat from the Saqqara pyramid in Egypt.** *Kung. Lantbr-Högsk. Ann.* 1950, 59-63, bibl. 10.

Notes on the taxonomy and characteristics of samples of 6-rowed *Hordeum vulgare*, *Triticum dicoccum* and *T. monococcum* dating from about 3000 B.C.—P.J.B.

LEGUMES

SOYABEAN

742 ROBERTS, J. A. **Soybeans—Victorian experiments.** *J. Dep. Agric. Vict.* 1951, **49**, 13-7.

The characteristics of the following mid-season varieties are described: Scioto, Potch, Illini, Gibson, Chief, Patoku, Irvine's Selection, Lincoln, and Dunfield.—K.O.

743 ILLINOIS Agricultural Experiment Station. Circ. 669. **Soybean yields in 1949 variety trials.** By *R. F. Fuelleman* and others. 1950, pp. 4.

744 HOLMBERG, S. A. Sojabönodlingens möjligheter och berättigande i vårt land. Några erfarenheter från förädlingsarbeten och försök vid Fiskeby. [**The possibilities of growing soyabeans in our land (Sweden). Some experiences of research and breeding at Fiskeby.**] *K. LantbrAkad. Tidskr. Stockh.* 1950, **89**, 460-8, bibl. 6.

Attempts to grow foreign varieties of soyabeans in Sweden have almost all proved unsuccessful, but selection of a cross between a north Japanese and a German variety will ripen seed as far north as 50°.30′ in Sweden. During 1946-49, three selections of Fiskeby III, a variety derived from the above cross, have given average seed yields of approximately 27 bu. per ac., with an oil content of 16.0 to 16.6 % and a crude protein content of 40.0 to 42.3%. Comparisons were made of the seed yield, oil and crude protein contents of the Fiskeby selections and the average results of the Co-operative Uniform Soyabean Tests in 1949 in the north-central States of the U.S.A. There was little difference between the seed yield and crude protein content of the seed, but the Fiskeby selections had about 4% lower oil content than the U.S. varieties. The Fiskeby selections are edible types, with good cooking quality and palatability. Future work at Fiskeby will be directed to increasing seed yield, while retaining the present standard of quality and early maturity.—P.J.B.

745 ILLINOIS Agricultural Experiment Station. Circ. 676. **Soybean diseases in Illinois.** By *D. Chamberlain* and *B. Koehler*. 1951, pp. 32.

Brief, notes, mainly of value to farmers, are given of the principle soyabean diseases occurring in Illinois, their prevalence, symptoms and control.——P.J.B.

746 MURAKISHI, H. H. **Purple seed stain of soybean.** *Phytopathology* 1951, **41**, 305-18, bibl. 31. [Pl. Path. Dept, North Carolina State Coll., Raleigh]

The symptoms of purple-stain disease of soyabeans caused by *Colletotrichum kikuchii* are described. In laboratory studies, 63% of untreated seed was infected with the pathogen. Following hot-water treatment for one hour at 44° and 48°C., infection was reduced to 11 and 2% of the seed, respectively. The germination of the treated seed was considerably reduced.—P.J.B.

747 PACKARD, C. M. **Insect pests of soybeans and their control.** *Soybean Digest* 1951, **11**, 14-8.

Practical recommendations are given for the control of the following insects: grasshoppers, Mexican bean beetle (*Epilachna varivestis*), Japanese beetle (*Poppillia japonica*), blister beetle (*Epicauta lemniscata*), flea beetles, leaf hoppers, velvet bean caterpillar (*Anticarsia gemmatilis*) and other species of caterpillars, red spiders (*Tetranychus* spp.) and white grubs (*Cyclocephala borealis*).—P.J.B.

GROUNDNUT

748 AGRONOMIE TROPICALE. Notes sur le bloc expérimental de culture mécanique de l'arachide de Kaffrine. [**Note on the experimental area under mechanically cultivated groundnuts at Kaffrine (French West Africa).**] *Agron. trop.* 1950, **5**, 513-6.

749 ROSSIN, M. Troisième compte rendu sur le développement du plan de culture mécanisée de l'arachide dans l'est africain anglais (Situation en Juin 1950). [**Third report on the development of mechanical cultivation of groundnuts (*Arachis hypogaea*) in British East Africa (The position in June, 1950).**] *Agron. trop.* 1951, **6**, 3-28.

[See also *Fld Crop Abstr.* 4. Abs. 406.]

750 ŠMARGONJ, E. N. [**The biology of fruit formation in *Arachis hypogaea* L.**] [Ukrainian]. *Bot. Ž.* 1949, **6**, No. 3, 34-40, bibl. 4, Russian summary, p. 40. [Received 1950]

751 VIRGINIA Agricultural Experiment Station. Bull. 439. **Peanut harvesting and drying research 1947-48-49.** By *G. E. Barlow* and others, 1950, pp. 19.

In 1947 and 1948, trials were carried out with experimental rack-driers for drying hay and peanuts together, and also with an experimental bin-drier for drying peanuts which had been picked from the haulms shortly after digging. These exploratory trials indicated that both runner and Jumbo peanuts could be dried efficiently either before or after separation from the vines. Trials were started in 1949 on an experimental, bin-type, continuous drier 8 ft. wide, 12 ft. long and 6 ft. high, equipped with a grilled bottom for the removal of the bottom layer of peanuts as they dried. Nuts dried at temperatures between 90° and 96°F. at a high rate of air-flow were of a similar, or slightly higher, grade than field-cured nuts, a result which provides a probable basis for the operation of driers in future tests. The tests showed that peanuts could be dried satisfactorily by this type of drier, but the variability of many of the factors involved made satisfactory curing of the nuts very difficult. Future research will be directed towards improving the curing-efficiency of driers. The minutes of the Peanut Harvesting and Curing Conference held in January, 1950, are reported. They embody a discussion of the work described above.—P.J.B.

PEA

752 SHORROCK, R. W. **Clean pea crops.** *Farming* 1950, **4**, 165-8.

DNPB has superceded MCPA and DNOC as a herbicide for the pea crop as it is less likely to injure delicate plants. It must be handled with care as it is toxic to man. A table is given indicating the various stages at which to treat different weeds. *Laspeyresia nigricana* can be controlled by 0.5 % DDT emulsion applied by high pressure spraying at not less than 100 gal. per acre according to the density of the foliage. *Macrosiphum pisi* can be controlled by 16.7 % DDT emulsion.—E.B.H.

BEAN

753 HOPKINS, H. T. and TOOLE, E. H. **Effect of DDT on germination of certain seeds.** *Bot. Gaz.* 1950, **112**, 130-2, bibl. 2. [Plant Industry Station, Beltsville, Md]

Pure DDT had no effect on the percentage germination of *Phaseolus lunatus* and *Secale cereale*. Technical DDT reduced percentage germination and profoundly affected seedling growth. The toxicity is thought to be due to some compound present as an impurity.—D.B.

754 BELGIAN CONGO, Institut National Étude Agronomique, INÉAC. Ser. Sci. No. 48. *Bruchus obtectus* Say ou bruche des haricots (*Phaseolus vulgaris* L.). [***Bruchus-obtectus* or bean-weevil**.] By *P. C. Lefèvre*, Bruxelles, 1950, pp. 65, tables, bibl. 53.

Phaseolus vulgaris is grown in most regions of the Belgian Congo and Ruanda-Urundi (the total annual production is about 300,000 metric tons), and in parts of these regions it is the basic food of the natives. *Bruchus obtectus* attacks this crop in the field and in storage. It also attacks the seeds of other legumes. Control measures, mechanical, physical and chemical, are reviewed. Various control trials were carried out at the INÉAC stations. Treatment with DDT in powder form appeared to be cheaper and more effective than treatment with pyrethrum powder. There was no decrease in germination power when 1 kg. of bean seeds were treated with 1 grm. of Geigy 33, a DDT preparation, which forms a coating of powder over the seed. In an investigation into the resistance of 20 bean varieties to *B. obtectus*, Wulma took the first place, followed by Kalerera. The yield of 19 of these varieties was over 1 metric ton of beans per ha. It was calculated that 12 months after harvest 4 only of these varieties had a minimum of 1 metric ton of seeds undamaged by *B. obtectus*.—E.B.

ROOTS

BEET

755 WILSON, A. S. B. **Fodder beet from seedbed to harvest.** *Fmrs Wkly* 1951, **34**, 59-60. [Boghall Exptl Farm, Edinburgh]

A review of the varieties, manuring, cultivation and harvesting of fodder sugar beet and its value as a feed for pigs.—P.J.B.

756 PROCHÁZKA, F. Pokusy s pěstováním řepného semene v kultuře přezimující ve volné půdě. [**Cultivation of beet for seed by overwintering in the open.** *Vestn. českosl. Akad. Zeměd.* 1950, **24**, 538-40.

757 DORPH-PETERSEN, K., and STEENBJERG, F. **Investigations of the effect of fertilizers containing sodium.** *Plant and Soil* 1950, **2**, 283-300, bibl. 16. [Expt Sta. Askov, Denmark]

The results are reported of field trials during three years to determine the effect on mangolds and fodder sugar beet (16 %—17 % dry matter) grown on sandy, loam and peat soils in Denmark, of: (1) a basal dressing of 400 kg. per ha. each of potassium fertilizer and superphosphate, (2) the basal dressing plus 30 kg. per ha. N in Chilean nitrate, (3) the basal dressing plus 60 kg. per ha. N in Chilean nitrate, (4) the basal dressing plus 60 kg. per ha. of calcium nitrate, (5) the basal dressing plus 60 kg. N in Chilean nitrate plus 400 kg. per ha. of agricultural salt. In four trials with mangolds [variety not stated], for treatments (1), (2), (3), (4) and (5), the average root yields were 511, 582, 671, 656 and 682 hkg. per ha., the dry-matter yields (roots only) being 75.7, 85.1, 95.6, 92.9 and 93.7 hkg. per ha., respectively. The average dry-matter content of the roots was 14.8, 14.6, 14.3, 14.2 and 13.7 %, respectively. In eleven trials using the same fertilizer dressings on fodder sugar beet [variety not specified] treatments (1), (2), (3), (4) and (5) gave an average root yield of 339, 391, 430, 416 and 438 hkg. per ha., an average dry matter yield (roots only) of 71.5, 81.9, 88.9, 86.1 and 91.0 hkg. per ha., and a dry matter content in the roots of 21.1, 20.9, 20.7, 20.7 and 20.8 %, respectively. Pot experiments on the sodium and potassium fertilization of fodder beet are also reported.—P.J.B.

SUGAR BEET

758 GREAT WESTERN SUGAR COMPANY. **How to grow sugar beets.** *Through the leaves* Nov.-Dec. 1950 and Jan-Feb. 1951, pp. 158.

" A manual for growing sugar beets, with emphasis on procedures applicable to the irrigated lands of Colorado, Nebraska, Wyoming, Montana and adjacent States, including information on the use of sugar beet by-products for fattening livestock and how sugar beet functions in the agricultural and industrial economy of these regions."—Extract.

759 RODRIGUEZ, L. C., and GOMEZ, E. V. Avance de las experiencias sobre el riego de la remolacha azucarera. [**Trials on the irrigation of sugar beet.**] *Bol. Inst. Invest. agron.* 1950, **10**, 187-218, English and French summaries p. 199, tables, graphs.

A series of trials are being carried out at El Encin, Alcalá de Henares, near Madrid, to study the water requirement of the principal Spanish crops. The experimental field consists of 108 plots which receive controlled quantities of irrigation water. Plants are grown at the same time in the plots and in lysimeters (the latter give the value of the evapotranspiration). An account is given of preliminary trials with sugar beet carried out in 1948-49, from which no definite conclusions, but some indications of practical interest, were obtained. The latter are summarised as follows: Irrigation should be given uniformly from the middle of June until the end of September (approximately 2 irrigations in June, 3 in July, 4 in August 3 in September and 2 in October). The quantity of irrigation water should vary from 300 to 400 c.m. per ha. per metric ton of roots, according to the type of soil and the amount of rainfall.—E.B.

760 KRUEGER, J., and SCHAEFER, O. Sind im Zuckerrübenbau noch Ertragssteigerungen möglich ? [**Are increased yields possible in the cultivation of sugar beet ?**] *Dtsch. Landw.* **3**, 31-7, bibl. 11.

HEYDE, H. Zum Erdtopfverfahren beim Zuckerrübenbau. [**The earth pot procedure in the cultivation of sugar beet.**] *Dtsch. Landw.* 1950, **4**, 53-6. [Landmaschinen-Institute, Univ. Berlin]

A method is described whereby sugar beet seed, instead of being drilled into the ground, is sown in individual earth pots made from balls of a cohesive compost soil which are compressed into the shape of solid, cylindrical pots and planted. The great advantages of the method are the protection afforded to the seedlings and their subsequent improved growth. By this method yield increases up to 50 % have been obtained. If this method continues to be successful in practice, machinery will need to be developed to make and handle the earth pots.—D.B.

761 INDUSTRIA SACCARIFERA ITALIANA. La sperimentazione bieticola dell'anno 1950. Relazione della Commissione per l'incremento ed il miglioramento della coltivazione della barbabietola da zucchero. [**Experiments with sugar beet in 1950. Report of the committee for the increase and improvement of sugar beet cultivation in Italy.**] *Industr. saccar. ital.* 1950, **43**, 316-29.

762 FUSCONI, A. Contributo allo studio delle migliori epoche di semina nella bieticoltura padana. [**A contribution to the study of the best sowing date for sugar beet in the Po valley.**] *Industr. saccar. ital.* 1951, **44**, 36-42, bibl. in text. [Ist. Agron. Univ. Bologna, Italy]

A series of trials was carried out in 1950 in 4 localities in the Po valley, namely, Corticella near Bologna, Mezzano near Ravenna, Migliaro near Ferrara and Agna near Padova. In each locality there were 30 experimental plots of 50 sq. m. each on which sugar beet was sown at 5 different dates, viz., 22-25th February, 3-8th March, 17-20th March (the normal date), 1-4th April and 11-15th April. The result of these trials confirmed that early sowing is an advantage in every district of the Po valley, the yield of roots and sugar being higher the earlier the sowing. The average sugar yield from the 4 localities was 67.7 q./ha. from the earliest sowing, 58.4 from the normal sowing and 49.6 from the latest sowing. There was a slight increase in the percentage of sugar in the roots as the sowing date became later. An early sowing in this region has the additional advantage of freeing the soil early for the wheat crop which usually follows sugar beet in the rotation.—E.B.

763 PRISJAŽNJUK, P. F. [**Pocket sowing of sugar beet.**] [Russian] *Agrobiologija* 1950, **6**, 86-93. [All-Union Res. Inst. Sugarbeet, Kiev]

In the beet growing provinces of the Ukraine, experiments conducted for 3 years indicated that with pocket sowing of unsegmented seed of sugar-beet the current rate of seeding, 30 kg. per ha., can be reduced by 16 to 20 kg. per ha. The saving of labour in singling amounts to 25 to 30 %. It has been established by the experiments that with pocket sowing the yielding capacity of sugar beet is increased by 10 to 25 %.—R.P.J.

764 BLAKE, G. A. **Sugar beet.** *N. Z. J. Agric.* 1950, **80**, 343-6. [Dep. Agric., Matamata, N.Z.]

The importance of the crop for pig feeding is stressed. Information is given regarding the place of sugar beet in a rotation, cultivation measures, and chemical analysis.—M.H.

765 ROEMER, T., and CZERATZKI, W. Sortenprüfung der Zuckerrüben in Deutschland seit 1920. [**Varietal trials with sugar beet in Germany since 1920.**] *Kühn-Arch.* 1949, **62**, 1-64, bibl. 50. [Received 1950] [Inst. Acker-und Pflanzenbau, Univ. Halle, E. Germany]

An account is given of the organization and methods used for testing varieties, and the results obtained, during the period 1920-40.—D.B.

766 TALLARICO, G. Zucchero ed olio dal pianoro silano. [**Sugar and oil from the plain of La Sila (Calabria, Italy).**] *G. Agric. Domen.* 1951, **61**, 117.

In the high plain of La Sila, in southern Italy, experimental crops of sugar beet and sunflower have have shown promise in the last few years, particularly under irrigation. Of the numerous Italian and foreign varieties of sugar beet under trial, those obtained from the Rovigo station for beet cultivation gave the best results. Regarding sunflower, two Russian varieties, including Giant of Odessa, gave the best results. Cold treatment of sunflower seed for 3 to 4 months increased the yield of seed per ha. and the oil content of the seed. It is thought that sugar beet and sunflower could replace, in part, rye and potato which are almost the only crops now grown in this district.—E.B.

767 DONÀ dalle ROSE, A. Due eccezionali infestazioni ai bietolai nella decorsa campagna (Cuscuta e altiche). [**Two exceptional infestations of sugar beet in Italy last harvest (*Cuscuta pentagona* and *Chaetocnema tibialis*).**] *Humus, Milan,* 1951, **7**, No. 2, 14-7. [Sta. sper. Bieticolt. Rovigo, Italy]

Strong *Cuscuta* infestations on sugar beet crops which have been recorded in Italy at intervals o many years, are thought to be favoured by particular climatic conditions. The winter 1949-50 wa mild, and the following spring and summer dry and warm on the whole. The attacks by *Chaetocnema tibialis* continued until the end of the summer —E.B.

768 LIMASSET, P., and others. Essais préliminaires relatifs à la lutte contre la jaunisse de la betterave. [**Preliminary trials on the control of sugar-beet yellows.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 679-81.

The virus causing sugar beet yellows is carried by the insect vectors *Myzus persicae* and *Aphis fabae.* The following control measures were tested :—isolation of the seed-bearing plants ; shelter barriers of hemp or maize surrounding the plots ; and treatment of sugar beet by (a) the aphicides nicotine sulphate (at 250 cc/hl.) [rate of application not specified] and (b) a product containing 4 % of a thiophosphate ester diluted to 0.25 %, [amount applied not specified]. Best control was obtained when the plots, sorrounded by hemp shelter barriers, were treated with nicotine sulphate.—K.O.

769 NOLTE, H.-W., and KLINKOWSKI, M. Die Bekämpfung der Rübenfliege mit Ester-Präparaten. [**Control of beet flea with ester compounds.**] *NachrBl. dtsch. PflSchDienst* 1950, **4**, 227-30, bibl. 4. [Biol. Zentralanst. für Land- und Forstwirtschaft, Aschersleben]

A high incidence of *Pegomyia hyoscyami* on both sugar and fodder beet in Central Germany in the spring of 1950 made it possible to attack the larvae on the leaves directly. The insecticides used were those ester compounds [not specified] known to act effectively via the plant tissues. Dusting provided a better distribution of insecticide over the plant and a better adherence to the leaf than did spraying, thus facilitating the " deep working" (systemic) effect.—D.B.

770 HUBERT, K. Die praktische Bekämpfung der Rübenblattwanze im Land Sachsen-Anhalt in den Nachkriegsjahren und ihre Erfolge. [**The practical control of the beet leaf bug in Saxony during the postwar years and its success.**] *NachrBl. dtsch. PflSchDienst* 1950, **30**, 44-55, bibl. 12. [Pflanzenschutzamt, Halle, Saxony]

Records are presented for the years 1946-49 of infestation of sugar beet plants. Breeding for resistance to the bug appears to be the only solution. —D.B.

771 BORGHI, M. Distribuzione dello zucchero e dei principali componenti nella bietola. [**Distribution of sugar and of the principal constituents in sugar beet.**] *Industr. saccar. ital.* 1950, **43**, 339-46.

[See *Fld Crop Abstr.* 3, Abs. 201] Research was continued in the 1949 harvest with beet of different types (high, medium and low sugar content) and size, collected at different dates in various localities. It was confirmed that small beet have a higher sugar content than large beet. Beet collected after rain generally had a higher degree of impurities than those of the same type collected before rain fell.—E.B.

772 ERICKSON, L. C. and PRICE, C. **Some effects of maleic hydrazide on sugar beet plants.** *Amer. J. Bot.* 1950, **37**, 657-9, bibl. 5. [Univ. California, Citrus Exp. Sta., Riverside; and Div. Sugar Plant Invest., Bur. Plant Ind., USDA]

The investigation was undertaken to find out if maleic hydrazide would inhibit plant growth, and hence bolting, in sugar beet without lowering the yield of sucrose in the root. In greenhouse tests "a concentration of 1.0 % maleic hydrazide permanently inhibited top growth with the result that most of the plants died within 4 months. Root growth was not directly retarded by the chemical. Field grown beets potted after a period of cold storage treatment showed a killing of stem tips by both 0.1 % and 0.5 % maleic hydrazide sprays." Spraying with 0.1 % maleic hydrazide caused development of narrow leaves indicating that the chemical had a formative as well as an inhibitory effect. The 0.1 % applications hastened the normal increase of the root/top ratio in sugar beet. The increase appeared to be partly due to an increase in root size of sprayed over non-sprayed plants. Experiments are in progress to study the effects of maleic hydrazide on sucrose accumulation in field grown sugar beets.—D.B.

773 MORANI, V., and ANTONELLI, C. Esperienze di concimazione alla bietola da zucchero nel comprensorio di Foligno. [**Sugar beet manuring trials in the Foligno area (Italy).**] *Industr. saccar. ital.* 1951, **44**, 29-35, bibl. 4. [Ist. Chim. e Industr. agr. Univ. Perugia]

These trials were concerned with P, K, N, and boron applications.—E.B.

774 JAEHNL, G. Über die Ertragsfestellung bei Versuchen mit Beta-Rüben. [**Determination of yields in trials with beet.**] *Bodenkultur* 1950, **4**, 238-40, bibl. 4. [Bundesanstalt für alpine Landwirtschaft, Admont, Austria]

Formulae are given for the more accurate calculation of fodder beet and sugar beet yields.—D.B.

TURNIP

775 KLOEN, D. Jarowisatie van stoppelknollenzaad. [**Vernalization of turnip seed.** *Maandbl. LandbVoorlDnst.* 1950, **7**, 193-201. [Plant Breeding Foundation, Wageningen]

A method of vernalizing turnip seed is described, in which the seed is germinated in trays at room temperature and then held for a period of up to several weeks at a temperature of 0.5°C. before sowing it in spring. The seed is allowed to do no more than begin germination prior to undergoing the cold-treatment and must not be allowed to develop further during the treatment, otherwise it cannot be sown by a seed drill. Certain varieties, such as Voorrang and Lucratief, have no need of this cold treatment in order to produce seed during the first year of sowing, provided they are sown in early March. The varieties Jobe, Oddi, Long White Redhead, Round White Redhead and Goldi each required a different cold treatment period, Goldi requiring the longest period. In trials in 1949, cold-treated seed was sown on the 24th February in rows 33 cm. apart. Voorrang and Lucratief began to shoot first, Goldi beginning about 14 days later. Voorrang and Lucratief were harvested for seed in the second half of July. Cold-treated seed sown on the 14th of March ripened too late for satisfactory harvesting. Data are given of the percentage of seed-producing shoots in the varieties Jobe, Goldi, Long White Redhead and Round White Redhead following cold-treatment for different periods.—P.J.B.

FIBRES

COTTON

776 DELATTRE, R. Rapport de mission. Maroc. Juillet-Août 1950. [**Report on a mission to Morocco. July-August 1950.**] *Cot. Fib. trop.* 1950, **5**, 193-204, bibl. 17.

The object of this mission was to study the possibilities of cotton growing in French Morocco where the new irrigation schemes would allow a considerable extension in the area under this crop. The cotton variety Pima, usually grown under irrigation, is generally a profitable crop there. The number of insect pests is small and there are no serious fungus diseases. The need for research to find other suitable cotton varieties and means for pest control is stressed. The vegetative cycle of the Egyptian varieties is too long in Morocco, particularly in the northern regions. The introduction of the American varieties is limited until effective control for *Earias* and *Empoasca* can be found. The destruction of those wild Malvaceae which are the host-plants of certain cotton pests is advised. —E.B.

777 ILTIS, J. Le coton au Maroc. [**Cotton in Morocco.**] *Cot. Fib. trop.* 1950, **5**, 73-83, figs, maps, bibl. 10.

In view of the fact that France imports 90 % of its cotton from foreign countries, this crop is being developed in the French territories overseas. In French Morocco the area under cotton varies considerably from year to year. It was 700 ha. in 1939 and 1000 ha. in 1948, and reached a maximum of 3140 ha. in 1943. With the irrigation works which are being carried out, it is thought that the cotton area there could reach 50,000 ha. Information is given on the climate of Morocco, the regions suitable to cotton, cultural methods, the control of insect pests, etc. As the rainy season lasts from October to May only, it is necessary to irrigate cotton almost everywhere. Pima 67, selected by the Centre de Recherches Agronomiques de Rabat from Algerian material, is the only variety grown for many years. Selection is being carried out to obtain new varieties suitable for irrigated and dry conditions.—E.B.

778 BARBUT, Évolution, situation actuelle et perspectives d'avenir de la culture du cotonnier en Algérie. [**Development, present position and future prospects of cotton cultivation in Algeria.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 676-81.

779 LHUILLIER, J. Le coton en A.O.F. (Culture sèche). Les possibilités de production et le programme des recherches envisagées par l'IRCT. [**Cotton in French West Africa (dry culture). The possibilities of production and the research programme of the Institut de Recherches du Coton et des Textiles exotiques.**] *Cot. Fib. trop.* 1950, **5**, 107-20, map, bibl. 2. [IRCT, Paris]

Five regions of cotton cultivation are described as to climate, varieties grown, and cultural methods used. The most important region is the middle zone of Dahomey and Togo; the others are the north zone of Dahomey and Togo, the region of the middle Ivory Coast, the region of the High Ivory Coast and Sikasso, and a central region in the French Sudan. The varieties cultivated differ from one region to another. Cotton is an important crop of long standing in some parts of the country, in others it has a limited importance. Many attempts to develop it and many failures have been recorded in the past. After some information on the research stations, a programme for the development of cotton cultivation is presented.—E.B.

780 LOMBARD, P. Les recherches agronomiques concernant la culture du coton à l'Office du Niger. 1. L'amélioration de la plante. 2 et fin. Les essais agronomiques. [**The agronomic research on cotton cultivation by the Niger Office. 1. Plant improvement. 2 an conclusion. Agronomic trials.**] *Cot. Fi trop.* 1950, **5**, 95-105, and 143-62.

Information is given on the land management o the irrigated area of French Sudan controlled by the Niger Office, the historical development o cotton cultivation, cotton varieties, selection an hybridization. Allen (average yield per ha. abou 1500 kg. of seed cotton) and N'Kourala are widely employed. Pedigree strains, selected recently from these 2 varieties, differ in their morphology and vegetative cycle but have a similar type of fibre Before 1946 animal power was employed exclusively and farmyard manure was given to the cotton crop, but with the introduction of mechanized cultivation in recent years it became necessary to grow more green manures and to apply chemica fertilizers as well. With regard to green manures *Crotalaria retusa* has been abandoned and *Sorghum* sp. is now being grown in preference. After 4 years' trials no definite conclusions were drawn as to the value of chemical fertilizers for cotton. However, N applications have proved effective. When the quantity of N given to the soil is higher than the quantity annually removed by the crop, small applications of phosphoric acid and K are also effective. Improvement of soil structure is considered of first importance for cotton cultivation in this region. As a result of a trial in which ridges of different width bearing from 1 to 4 rows of cotton were tested, ridges 1.80 m. wide with 2 rows of cotton were adopted.—E.B.

781 BRIXHE, A. Le coton au Congo belge. [**Cotton in the Belgian Congo.**] *Cot. Fib. trop.* 1950, **5**, 1-34, figs. maps., bibl. 46. [Compagnie Cotonnière Congolaise]

This is a general review, dealing with historical development, culture, research, etc., of cotton cultivation in the Belgian Congo. Cotton growing started about 30 years ago and now covers over 250,000 ha. each year, and is still extending. The yearly production of seed-cotton varies from 125 to 145 thousand tons.—E.B.

782 TURGAY, N. Aperçu sur l'évolution de la production cotonnière en Turquie pendant les deux dernières années. [**An outline of the development of cotton production in Turkey during the last two years.**] *Cot. Fib. trop.* 1950, **5**, 106, bibl. 1. [Min. Agric. Angora]

[See *Fld Crop Abstr.* 1, Abs. 1306] In 1949 the cotton area in Turkey was 335,000 ha. and the production 100,000 tons of cotton lint, 31,581 tons of which were exported. The varieties Acala 130 and Y.193, both selected by the Adana station, which proved resistant to rain and wind in 1949 were in great demand for 1950 sowings.—E.B.

783 CRUZ, E. E., and BARTOLOME, R. **Cotton in the Philippines.** *Philipp. J. Agric.* 1950, **14**, 307-21, bibl. 31. [Bur. Plant Indust.]

784 BELGIAN CONGO, Institut National Étude Agronomique, INÉAC. Ser. Tech. No. 36. Étude des qualités et des méthodes de multiplication des nouvelles variétés cotonnières au Congo Belge. [**A study of quality and methods of multiplying new cotton varieties in the Belgian Congo.**] By *M. Lecomte.* Bruxelles, 1949, pp. 56, bibl. 32, tables 5, map.

The problem of how to bring new cotton varieties into cultivation is examined, and a solution is presented for conditions in the Belgian Congo. The method explained was employed successfully in distributing seed of the variety Stoneville. This variety, re-selected at the Bambesa station, has replaced Triumph in the Uele region. It appears that in the Belgian Congo it is advisable to grow only a few cotton varieties with a high degree of purity to ensure homogeneity and stability of characters. The use of mixtures of varieties proved unsuccessful.—E.B.

785 KHADILKAR, T. R. **Improvement in Khandesh cottons.** *Indian Cott. Grow, Rev.* 1951, **4**, 212-26, bibl. 5, map.

The segregate 197-3 of the cross Jarila × N.R.5 is superior to Jarila in ginning quality, yield and staple length. It is estimated to give 30 % more profit to the cultivator. It is as resistant to wilt as Jarila. 197-3 is distinguishable from Jarila by its white flowers and deep green leaves, whereas Jarila has deep yellow flowers and light green leaves.—N.G.S.

786 CHEVALIER, A. Existe-t-il des cotonniers sauvages en Océanie ? [**Are there any wild cottons in Oceania** ?] *Rev. Bot. appl.* 1951, **31**, 53-4.

There are several wild species of *Gossypium* in Oceania, none of which has fibre of value.—E.B.

787 UNITED STATES Department of Agriculture. Tech. Bull. No. 1025. **Cottonseed treatment : its effect on seedling emergence, seedling survival, plant stands and yields.** By the Committee on cotton seedling diseases of the Cotton Disease Council. 1950, pp. 134.

This bulletin summarizes the results of extensive field sowings of cotton made in 10 States during 1936 to 1942 to evaluate different seed treatments and to determine the extent to which response to seed treatment was correlated with the characteristics of different types of cotton seed. The increase in seedling emergence and survival following seed treatment was greatest in fuzzy and heavily reginned seed infested with anthracnose (*Colletotrichum gossypii*) and *Rhizopus nigricans*. The treatment of uninfected seed of good viability did not result in significant increases in seedling emergence and survival, even where emergence was low. For all types of seed, seedling emergence tended to be greater following seed treatment when the emergence of early sowings was delayed by cool, damp weather, than where late plantings were made in favourable weather conditions. The action of the seed treatment appeared to be disinfectant, rather than protectant ; though in several trials seed treatment reduced the incidence of damping-off in seedlings, compared to untreated controls. The effectiveness of seed treatment was less on the heavy soils of the Mississippi delta than on light, better drained soils. Relatively heavy treatments with comparatively volatile, but insoluble mercurial compounds were less toxic to the seed than less volatile, but more soluble compounds. Volatile and non-volatile compounds were equally effective on acid-delinted seed, but for fuzzy and reginned seed, a measure of volatility in the fungicide appeared to be necessary for effective action. In most of the trials, seed treatment produced little or no increase in seed yield, since the plant numbers after thinning were much the same for both treated and untreated seed, though the average seed yields of plants from seed infected with *C. gossypii* were 7 to 12 % higher than those of untreated seed. Seed treatment proved very valuable in cases where reseeding was necessary in unfavourable seasons. Seed treatment of acid-delinted seed produced only small increases in seedling emergence ; but large increases in emergence, compared to untreated controls, were noted where the emergence of this type of seed was delayed by cool, rainy weather. There were no significant differences between the respective ability of reginned, acid-delinted, water-graded delinted and fuzzy seed to produce plant stands following seed treatment.—P.J.B.

788 GOLDOVSKIĬ, A. M., and PODOLJSKAJA, M. Z. [**Variations in the gossypol content of some species of Gossypium.**] [Russian] *Bot. Ž. SSSR* 1951, **36**, 54-9, bibl. 13.

The invariable presence of gossypol in the seeds of all species of *Gossypium* hitherto studied confirms the hypothesis that gossypol is specific for the whole genus. With the arrangement of the species studied in a series in order of their gossypol and oil contents, the extreme members of the series are *G. herbaceum* of the Old World cottons with a gossypol content as low as 0.19 %, and *G. barbadense* of the New World cottons with a gossypol content reaching 1.71 %. The remaining species occupy intermediate positions in this series according to gossypol content and the magnitude of the ratio oil/gossypol : this ratio is greatest in *G. herbaceum* and least in *G. barbadense.*—R.P.J.

789 Guimarães, J. de A. Principais pragas do algodoeiro. [**Principal cotton pests (in Brazil).**] *Agronomia, Rio de Janeiro*, 1950, **9**, 61-6.

Methods for controlling the horn-beetle *Eutinobothrus brasiliensis* are : destroy all wild Malvaceae which could act as alternate hosts ; plant annual varieties of cotton, pull them up after harvest, and burn them at a distance from the cultivated area ; adopt a crop rotation ; do not sow cotton immediately after ploughing, which should be done at once after harvest. At least four months should be allowed for stubble, etc. to rot down in the soil before any fresh cultivations are made ; do not plant in ground where there has been a recent attack of horn-beetle. The control of the rosy caterpillar, *Platyedra gossypiella* consists principally in cleaning the seed, in which the young caterpillars live. Other measures of control are the destruction of stubble, and the eradication of wild members of the Malvaceae, mainly " quiabeiro " [botanical name not given], which act as alternate hosts.—N.G.S.

790 Balasubramanyan, R., and Kesava Iyengar, N. **The problem of jassids on American cotton in Madras with special reference to black soils of ceded districts.** *Indian Cott. Grow. Rev.* 1950, **4**, 199-211, bibl. 15. [Dept. Agric., Madras]

The leaf hopper jassid (*Empoasca devastans*) is a major pest of American cotton in India. Of all the varieties tested, MA 2 was the most resistant. Late-sown crops were more susceptible than early-sown crops. Widely spaced cotton suffered more than the closely planted. Susceptible varieties contained more leaf moisture than resistant varieties. While lack of leaf-hairs may lead to low resistance, the converse is not invariably true, and hairy plants should be tested under late-planted conditions. It is concluded that jassids could be controlled by the development of hairy varieties, which should be closely planted early in the season.—N.G.S.

791 May, A. W. S. **The cotton jassid [*Empoasca maculata*] problem in Queensland.** *Qd J. agric. Sci.* 1950, **7**, 24-42, bibl. 17.

Soil condition, cultural treatment, time of planting, and variety of cotton are shown to influence plant susceptibility to jassid injury. The breeding of jassid-resistant varieties is stated to be the only control measure which is likely to be practicable.—Author's summary.

792 Smith, G. L., and Bryan, D. E. **Mites on cotton.** *Calif. Agric.* 1951, **5**, 11, 15.

Brief notes are given on the control of spider mites. Aeroplane applications of dusts and sprays have not given effective control of the two-spotted mite (*Tetranychus bimaculatus*), though two applications of 1 % parathion dust at an interval of four days with row-crop equipment giving a thorough coverage have controlled both *T. bimaculatus* and the Pacific mite (*T. pacificus*). Sulphur dusts have given good control of the Atlantic mite (*T. atlanticus*), but not of the other two pests.—P.J.B.

793 Elting, J. P. **Cavitomic cotton.** *Science* 1951, **113**, 297-9, bibl. 3. [Res. Lab., Kenda Mills, Paw Creek, N.C.]

The term " cavitomic " is used to designate the changes in fibre properties brought about by the presence of micro-organisms in and on the fibre. Maps are given showing the increase in the prevalence of cavitomic cotton in the U.S.A. Tests for cavitoma are briefly noted. Stress is laid on the lack of general recognition of the increasingly widespread prevalence of cavitomic cotton in the U.S.A.—P.J.B.

794 Abdul Hameed Khan, and Mohammad Afzal. **Vicinism in cotton.** *Indian Cott. Grow. Rev.* 1950, **4**, 227-39, bibl. 10. [Cotton Res. Lab., Lyallpur, Pakistan]

Transmission of cotton pollen was shown to be entirely due to insects. Under conditions at Lyallpur, 2 % of natural crossing may be expected in all types of cotton growing under all systems of field layout, and also when cottons of different varieties are sown in adjacent holes or rows. Under field conditions, there was little natural crossing beyond 15 feet. To check natural crossing, a barrier, 40 feet wide, of desi cotton is recommended for desi cotton (or of American cotton for American cotton). Widths of 45 feet of open space, or of 75 feet under sorghum, also provide an effective check.—N.G.S.

795 Bregetova, L. G. [**The content of ascorbic acid in the leaves of the cotton plant.**] [Russian] *Bot. Ž. SSSR* 1951, **36**, 34-8, bibl. 9. [Lab. Pl. Phys. Bot. Inst., Stalinabad]

796 McIlrath, W. J. **Cotton-leaf malformations induced by organic phosphate insecticides.** *Bot. Gaz.* 1950, **112**, 221-5, bibl. 9. [Texas Agric. Exp. Sta., College Station]

This investigation dealt with the leaf responses of 30-day-old Stoneville 2B cotton plants to various concentrations of hexaethyl tetraphosphate (HETP), tetraethyl pyrophosphate (TEPP), and O'O-diethyl O.-p-nitrophenyl thiophosphate (parathion). Application of commercial formulations of HETP and TEPP in concentrations of fifteen to thirty times the recommended insecticidal dosage resulted in malformation of leaves subsequently produced. The malformation closely resembled that induced by 2,4-D. HETP was more effective in inducing such leaf malformations than was TEPP. Plants grown during the winter months exhibited more severe leaf malformation than those grown in the other seasons. The factors of light intensity and temperature are discussed in this regard. Parathion applications resulted in the production of leaves which were many-lobed as contrasted to the three to five lobes of normal leaves.—Author's summary.

797 ZANINI, E. Risultati, interpretazione e prospettive della jarovizzazione. [**Results, interpretation and prospects of vernalization.**] *G. Sci. nat. econ. Palermo* 1950, **47**, pp. 11, figs. 10, bibl. 28. [Ist. Agron. Univ. Palermo]

Some first results are given from a series of vernalization trials with cotton, field bean (*Vicia faba*), and an autumn hard wheat. Cotton seeds of the variety Texacala, which had absorbed 30 and 35 % of their weight of distilled water, were heat-treated at 40°C. for 12 and 20 days. Only a few of these seeds developed into normal plants producing bolls at the same time as the non-treated control plants. Another group of cotton seeds, which had absorbed 35 and 40 % of their weight of water, were cold-treated at 3 to 5°C. for 20 and 30 days. These seeds developed normally, the seeds treated for 30 days giving plants which flowered 14 and 18 days earlier than the controls. It is not yet known whether this vernalization treatment of cotton can be of any practical value because the trials were carried out late in the season, so that the bolls did not ripen completely. In *Vicia faba*, the plants from vernalized seeds started flowering 57 days after sowing, while those from non-vernalized seeds flowered about 1 month later. These results are discussed in relation to Lysenko's theories.—E.B.

FLAX

798 PASCUAL, M. P. Estudio comparativo de cinco variedades de lino. [**Comparative study of five varieties of fibre flax.**] *Bol. Inst. Invest. Agron.* 1950, **10**, 49-73, English and French summaries p. 73. [Estación de Cultivos de Grandes Regadiós, Zaragoza, Spain]

The varieties Percello, Concurrent, Hollandia, Formosa and Rembrandt, obtained from the Wageningen Station, Netherlands, were grown under irrigation at Zaragoza, Spain. Observations were made during the whole of their vegetative period. Formosa was the first to flower, followed by Concurrent, Hollandia, Percello and Rembrandt. Hollandia was the earliest in seeding. With regard to the height and uniformity of the plants, Formosa was placed first, followed by Rembrandt, Percello, Concurrent and Hollandia. Hollandia gave the heaviest seed yield, followed by Percello, Concurrent Rembrandt and Formosa. Formosa gave the highest stem yield and Rembrandt the highest fibre yield.—E.B.

799 MILLIKAN, C. R. **Relation between nitrogen source and the effects on flax of an excess of manganese or molybdenum in the nutrient solution.** *Aust. J. sci. Res.* Ser. B. 1950, **3**, 450-73, bibl. 42, pl. 3. [Dept Agric. Burnley, Victoria.]

Water culture experiments were conducted to determine the effects of N-deficiency or of N supplied as NO_3—, NH_4NO_3, NH_4+, or $CO(NH_2)_2$ (urea), on the toxicity to flax plants of an excess of Mn or Mo or both, in the nutrient solution. With a given excess of Mn, symptoms were most severe in flax plants grown in solution supplied with N as NO_3— or $CO(NH_2)_2$, and were absent in N-deficient solutions or those supplied with N as NH_4+. In solutions supplied with NH_4NO_3, no Mn toxicity symptoms occurred. In contrast, at a given excess of Mo in the nutrient solution, toxicity symptoms in the test plants were affected by N source in the following order of decreasing severity: N deficiency $> NH_4+ > NH_4NO_3 > CO(NH_2)_2 > NO_3$—. In solutions supplied with NO_3—, ammonium molybdate was more toxic to growth than sodium molybdate. Where excess Mn and Mo were added to the nutrient solution, in the presence of NH_4+ ions an interaction between the two elements occurred. The severity of Mn-induced Fe-deficiency chlorosis and lower leaf necrosis was reduced but a chlorosis similar to Mo toxicity symptoms was induced in the plants in the presence of NO_3—, NH_4NO_3 or $CO(NH_2)_2$.—From author's summary.

HEMP

800 FILENI, E. Tipiche coltivazioni italiane. La canapa da seme. [**Typical Italian crops. Seed hemp.**] *Humus, Milan* 1951, **7**, 24.

In the region of Carmagnola, Piedmont, hemp, a long-established crop, is mainly grown for seed. The plants are strong, hardy and grow normally to a height of 4 to 5 m., and in some zones to 8 m. The yield is 7 to 8 q. of seed per ha.—E.B.

JUTE

801 WALKER, W. A. M. **Jute and the jute industry.** *World Crops* 1951, **3**, 127-30, 138, illus.

802 CRUZ, E. E. **Jute industry in Pakistan and New India.** *Philippine J. Agric.* 1950, **14**, 323-33, bibl. 6, illus. [Bur. Plant Industr.]

OTHER

803 CHEMNITIUS, K. Der Besenginster. [**Broom.**] *Dtsch. Landw.* 1948, **2**, 176-7. [Received 1950] [Weimar, Germany]

An account is given of the cultivation of *Sarothamnus scoparius* and the use of its fibres for paper making.—D.B.

OIL CROPS

LINSEED

804 WRAIGHT, J. D. **Growing linseed.** *N. Z. J. Agric.* 1950, **81**, 441-4. [Dept Agric., Timaru, N.Z.]

The author gives information on cultivation measures, varieties, diseases and pests, and harvesting.—M.H.

805 FRAPPA, C. Essais de culture de lin oléagineux et parasites à Madagascar. [**Cultivation trials and parasites of linseed in Madagascar.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 371-3.

806 BUTLER, J. I. C. Welke mogelijkheden heeft de teelt van olievlas in ons land ? [**What are the prospects for oil flax growing in the Netherlands ?**] *Landbouwk. Tijdschr.* 1950, **62**, 724-31. [Netherlands Flax Inst., Wageningen]

The quality of the linseed grown in the Netherlands is very good ; the quantity per unit area can be increased by means which are outlined. In certain, specified regions the culture would probably be remunerative, but prospects require further study with special reference to production trends in Argentina and North America.—G.M.R.

807 CLAVER, F. K. Efecto del 2,4-D sobre el porcentaje de aceite e indice de yodo en lino. [**Effect of 2,4-D on the oil content and iodine index of linseed.**] *Rev. Fac. Agron. La Plata* 1950, **27**, 285-8, bibl. 3. and in text, English summary, p. 288.

The ammonia salt of 2,4-D was applied to the linseed variety Querandi M. A. at rates of 370.3 grm, 498.5 grm., and 617.1 grm. acid equivalent in 70 litres of water per ha. Spraying took place 20 days before flowering. An average decrease of oil content of 1.6 % was obtained with each concentration. The iodine index was unaffected.—N.G.S.

808 FRIEDERICH, J. C. Onkruidbestrijding, veredeling, zaadvorming en optreden van enkele parasitaire schimmels in olievlas. [**Oil flax ; weed control, breeding, seed formation and attack by certain fungi.**] *Landbouwk. Tijdschr.* 1950, **62**, 731-9, bibl. 8. [Cent. Inst. Agric. Res. and Netherlands Flax Inst., Wageningen]

The application and nature of weedkillers used in oil flax cultures are described, preference being given to those which contain DNC and butylphenol. Seven regional types of oil flax varieties are compared. A study of thousand grain weight and fat content in two varieties grown in thirteen different soils shows that little relation exists between these two characters, which depend entirely on the conditions under which the seed develops and on the time of harvesting. After flowering, oil flax seed takes 20 to 30 days to attain its maximum fat content and 30 to 50 days to attain full maturity according to soil moisture content and the temperature and relative humidity of the air. In an experiment with the variety Daehnfeldt, maximum fat content was reached about a week before maximum thousand grain weight. The chief fungi attacking oil flax in the Netherlands are *Botrytis cinerea* and *Alternaria lini*, and a positive correlation between the degree of attack and late harvesting appears to exist.—G.M.R.

RAPE

809 ARMSTRONG, J. M. **A tetraploid form of annual rape induced by colchicine.** *Trans. Roy. Soc. Canad.* (Sect. 5.) 1950, **44**, 21-38, bibl. 25.

In trials with tetraploid German rape (*Brassica rapa annua oleifera*), there were significant differences between strains in respect of seed-weight and yield. In 1949, Strain 15 yielded 842 lb. per ac. of seed, compared to 473 lb. per ac. for Strain 26, the lowest yielding. It is deduced from these variations in yield that there is scope for selection among tetraploid rapes. Direct comparisons could not be made with diploid strains, owing to the danger of cross-pollination, but a number of tetraploid strains excelled diploids in seed yield. Meiotic studies showed that the tetraploid strains suffered no impairment of fertility owing to chromosome irregularities. Significant differences were noted between the characteristics of the oil from tetraploid and diploid seed. The tetraploid strains showed a high coefficient of variability in percentage oil extracted, linoleic acid, linolenic acid and free fatty acid. The average percentage of oil extracted for all the tetraploid strains was lower than that of the diploids, but certain of the tetraploid strains were high enough in percentage oil extracted to warrant selection.—P.J.B.

810 KLITSCH, C. Klarheit um den Winterraps. [**Fresh light on winter rape.**] *Dtsch. Landw.* 1948, **2**, 104-8 and 115-20. [Received 1950] [Jena, E. Germany]

811 VALLE, O. Kokemuksia syysrypsin ensimmäisiltä talousviljelyksiltä Suomessa. Satotuloksia vuosilta 1948 ja 1949. [**Experiences from the earliest practical cultivations of**

winter turnip rape in Finland. Yield results from 1948 and 1949.] *Siemenjulkaisu* 1950, 157-75, English summary, p. 175.

Experiments with winter turnip rape have been carried out in Finland by the Agricultural Research Institute, Department of Plant Husbandry, at Tikkurila from 1946 to 1949. These experiments have proved the crop to be a very serviceable oil plant in Finnish conditions. Apart from the usual field tests, the small-scale cultivation of winter turnip rape has recently been started on farms primarily in the south-west of Finland. The crop was harvested in 1948 and 1949 from 1947 and 1948 sowings. The results of the cultivation technique applied and crop yields are tabulated.

In Finnish conditions, winter turnip rape should be sown in the latter half of July. The seed generally ripens in the 2nd week of July. The average yield has been about 100 kg. of seed per ha.—From author's summary.

OTHER

812 Jacenko, V. G. [***Crambe abyssinica*, a new fatty oil crop.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 10, 37-40, bibl. in text.

Investigations with *C. abyssinica* have been in progress at the Voronež Agricultural Institute since 1932. On the average of 1948-49 trials, *Crambe* gave a seed yield per ha. 2 to 2.5 times greater and an oil yield 2 to 4 times greater than that of *Sinapis*. The usual rate of seeding of *Crambe* is 20 to 25 kg./ha., but on soils liberally supplied with nutrients and moisture, a rate of 10 to 15 kg./ha. is adequate. Harvesting by combine is recommended.—R.P.J.

OTHER CROPS

813 Sauer, J. D. **The grain amaranths: a survey of their history and classification.** *Ann. Mo. bot. Gdn* 1950, **37**, 561-632, bibl. 144, pl. 14. [Univ. Wisconsin, Madison]

814 Mullins, D. **Teasel growing—an ancient practice.** *World Crops* 1951, **3**, 146-7, illus.

A description of the cultivation of *Dipsacus fullonum* in Somerset.—N.G.S.

LAND USE, SURVEYS AND MANAGEMENT

815 Klitsch, C. Fruchtartenverhältnis und Fruchtfolge—eine oft nicht genügend beachtete Wirkungsmöglichkeit ackerbaulicher Kultur- und Leistungssteigerung. [**Cropping areas and crop rotation—a practical possibility which is not sufficiently considered for increasing arable cultivation and its productivity.**] *Dtsch. Landw.* 1950, **4**, 100-9. [Jena]

The double aspect of planning the crops of arable land, i.e. their relationship in space (cropping areas) and in time (crop rotations) is not always appreciated. Some fundamental principles governing this double relationship are discussed. Examples are given of the application of these principles to Thuringia, but they also apply to the whole of central Germany and to Saxony. The key to the planning of cropping areas and crop rotations is the provision of fodder for all animals. This fodder should come from all possible sources, not merely from grasses and clovers. Cash crops are of secondary importance and should occupy what land is left. The place of root crops, legumes, oil crops, vegetables and cereals, having regard to their individual needs, is discussed.—D.B.

816 Repp, G. Untersuchungen über die Kultivierung von Salzböden. [**Investigations in the cultivation of saline soils.**] *Bodenkultur* 1950, **4**, 329-54, bibl. 39.

An ecological study has been made of the extensive alkali steppe in Hungary. Originally this was swampy land supporting a rich vegetation; its present condition is largely a result of river regulation by man. The most important ecological factors governing the vegetation are the alternation of extremes of abundance and scarcity of water and the high content of sodium salts in the soil. These latter are not only directly harmful to the plant but they also damage the physical structure of the soil (already high in clay) which becomes impervious and very poor in soil bacteria. The salt layer is now so near to the surface that it is at root level. Until recently, the dry salt steppe was unused except for grazing. For agricultural production the most important measures are irrigation and drainage. The most advantageous crops are those which cover the soil for the longest period, with the densest cover; e.g., perennial fodder grasses and legumes and sown meadows. In certain cases, swamp crops, such as rice, are suitable. When crops fail, the wild plants invade again, but since revegetation is very slow the soil surface remains exposed for a long time. [From *Herbage Abstracts*.]—D.B.

817 Agronomie Tropicale. Notes sur les aménagements dans le delta du Sénégal. [**Note on land and water management in the delta of the Senegal.**] *Agron. trop.* 1950, **5**, 508-13.

818 Viguier, P. La mise en valeur par la colonisation africaine des terres irriguées du Delta Central nigérien. [**The improvement through African colonization of the irrigated land of the "Delta Central" of the Niger (French Sudan).**] *Agron. trop.* 1950, **5**, 152-77.

A general account is given of the works which are being carried out for the management and utilization of the "Delta Central" of the Niger. The utilization of this area is based on irrigation and colonization by African settlers, a proportion of whom come from distant regions. It is calculated that about a million hectares of land are particularly suited to cotton and about 700,000 ha. to rice cultivation, but with the irrigation works so far completed it would be possible to irrigate less than a third of this area. At present 12,000 ha. under rice and 6000 ha. under cotton are irrigated. The Niger Office is in charge of the study and execution of the improvement works. Methods of cultivation are explained. In the area more suited to cotton cultivation, the rotation cotton/green manures is practised on the best soils and the rotation rice/fallow on the unlevelled or badly drained soils. In the area more suited to rice cultivation, no rotation is practised at present. In 1948-49 the paddy yield varied from 13 to 22.7 q./ha. (in many areas it averaged 20 q./ha.), and the average seed-cotton yield was 7.8 q./ha.—E.B.

819 Hall, T. D., and others. **The agriculture of the Union of South Africa with reference to major crops and fertilizer usage.** *S. Afr. J. Sci.* 1951, **47**, 213-4.

FARMING SYSTEMS AND PRACTICES

820 Steden. Die landwirtschaftlichen Betriebsformen in Niederösterreich. [**Types of farming in Lower Austria.**] *Bodenkultur* 1950, **4**, 257-77. [Hochschule für Bodenkultur, Wien, Austria]

821 Rogier, M., and Lyon-Caen, A. La culture mécanique de l'arachide et la conservation des sols dans la région schisto-calcaire du Moyen-Congo. [**Mechanized cultivation of groundnuts and the conservation of soil in the calcareous-schist region of the Middle Congo.**] *Bull. agric. Congo Belge* 1949, **40**, 2010-28. [Received 1950]

An account is given of the work carried out during the first two working years of the Station de Modernisation Agricole for French Equatorial Africa situated in the Ludima district. The work of the Station was centred on the problems arising from the development of mechanized cultivation of groundnuts and other food crops. Information is given on the climate, vegetation and the cultivation systems of this area. The land is cropped for 3 or 4 years with groundnuts, soyabean, maize and green manures, and is then left under a planted woody fallow for 8 or 10 years. The best results were obtained from erect groundnut varieties with a vegetative period of less than 100 days.—E.B.

822 Charlottetown, Dominion Experimental Station (P.E.I., Canada). **Systems of applying manure in a four-course rotation.** *Charlottetown Domin. Expt Sta. Progress Report* 1937-1947. 1950, pp. 28-31.

Data are given of trials during 1940 to 1947 to determine the best of eight systems of applying farmyard manure in the following rotations: (1) potatoes-oats-clover-timothy and (2) maize (for fodder)-oats-clover-timothy. In the potato rotation, the highest total yield of fodder units for all crops during the rotation followed the application of 20 tons per ac. of manure to the timothy sod before ploughing. In the maize rotation, the application of 20 tons per ac. of manure to the oats as a top-dressing gave the highest total fodder unit yield over the rotation, but tended to favour only the last three crops in the rotation and caused oat lodging in wet seasons. Other treatments that gave only slightly lower yields than the last mentioned were: (1) 20 tons per ac. of manure to the timothy sod before ploughing for maize. (2) 10 tons per ac. as a top-dressing to the oats and 10 tons per ac. to the ploughed timothy sod before the maize.—P.J.B.

823 Troll, H. J. Süsslupinen-Sommergetreide-Gemenge als Risikoausgleich für Kleinbetriebe. [**Sweet lupin—summer cereal mixture to compensate for risks on small holdings.**] *Dtsch. Landw.* 1948, **2**, 7-10. [Received 1950] [Zentralforschungsanstalt für Pflanzenzucht, Müncheberg]

824 Russell, E. W. **How deep to plough?** *Farming* 1950, **4**, 358-62.

According to experimental results obtained at Rothamsted and elsewhere cereals are little affected by depth of ploughing; potatoes benefit from deep ploughing only if the fertilizer is put in the bouts; sugar beet benefits, particularly if the potash it is to be given is applied before ploughing. On deep-ploughed plots there is a tendency for germination of wheat and sugar beet to be worse, but for the early weed growth in the seed bed to be less than on shallow ploughed plots. Deep ploughing is inadvisable on stony or rocky subsoil, or on undrained land where the water-table is high and there is a pan. Pronounced nutrient deficiencies in the subsoil should be corrected before deep ploughing. More work is required before the minimum advantageous depth of ploughing can be determined. Experiments are still in progress.—E.B.H.

825 MARCHAL, A. Les conséquences du labour à la charrue dans les sols légers sahéliens. [**The consequences of ploughing the light Sahel soils (Upper Senegal).**] *Bull. agric. Congo Belge* 1949, **40**, 1999-2003. [Received 1950]

When they are cultivated deeper than 2 cm., there is a rapid loss of fertility in the Sahel soils. The total clearing of trees and shrubs is also harmful since they protect the surface from the sun, bind the soil with their roots, and build up fertility (many species being Leguminosae). The land is generally cropped for 6 years, rested for 4 or 5, cropped again for 3 years and then fallowed for 10 to 15 years. The predominance of *Cenchrus biflorus* and *Alysicarpus vaginalis* in the vegetation is considered an indication of soil fertility, while a predominance of *Fimbristylis exilis*, *Chrozophora senegalensis* and *Aristida stipoides* is an indication that the soil is losing fertility.—E.B.

826 ROBERTS, R. H. **Irrigation in America.** *Rhod. agric. J.* 1950, **47**, 510-30.

A report of the author's visit to America to study irrigation practices and to obtain advice on the development of irrigation in the Sabi Valley, Southern Rhodesia. Irrigation crops grown in America include lucerne, maize, barley, sorghum, cotton, rice, and pasture grasses. Their prospects as irrigation crops for Southern Rhodesia are discussed. [This abstract also appears in *Herbage Abstracts*].—K.O.

SOIL AND WATER CONSERVATION

827 ILLINOIS Agricultural Experiment Station. Bull. 540. **Costs and benefits from soil conservation in north-eastern Illinois.** By *E. L. Sauer* and others. 1950, pp. 563-96.

828 NEBRASKA Agricultural Experiment Station. Bull. 395. **Land resources and recommended conservation practices in Nebraska.** By *F. Miller* and *A. Anderson*. 1949, pp. 140.

829 JACOB, H. Fruchtfolge und Bodenerosion in Norddeutschland. [**Crop rotation and soil erosion in North Germany.**] *Dtsch. Landw.* 1949, **3**, 165-8.

WEEDS AND WEED CONTROL

830 SCHAEFFLER, H. Das Auftreten des Flughafers (*Avena fatua* L.) in Bayern und die derzeitigen Möglichkeiten zu seiner Bekämpfung. [**The occurrence of wild oats *Avena fatua* L.) in Bavaria and the possibilities of its control.**] *Z. Pflanzenb. PflSch.* 1950, **1**, 1-85, bibl. 46. [Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, München]

A. fatua, one of the worst weeds in Bavaria, has greatly increased in recent years. It infests all cereal fields, stands of clover and grasses, and fields of potato, fodder beet and sugar beet; it is particularly harmful in cereal seed production. The present distribution range and density of the weed are mapped. There are many factors influencing heavy infestation; among them are soil, climate, severe winters of the past 10 years, land configuration, land tenure systems, difficulty of maintaining good husbandry during the war years, insufficient fertilizers, and ignorance among the farming community of the life history of the weed. Infestation by *A. fatua* is costly from many standpoints; it reduces crop yields partly from its own powers of competition and partly because the control measures may damage the crops.

Preventive measures are recommended for land which is free of the pest and controls are recommended for infested land. The former consist of the examination of all cereal seed (especially oats) and of animal feed (especially fodder cereals) and the elimination of the smallest colony of *A. fatua* on the land. These preventive measures also apply to infested land. Control measures are directed towards promoting the health of the soil and the crop. Shallow ploughing immediately after harvesting the main crop is essential. This is followed by deeper ploughing. Seed should not be broadcast but drilled in rows to facilitate weeding. Crop rotation is an important factor in control. Summer cereals and grain legumes, crops in which *A. fatua* thrives, must be reduced to a minimum and not grown repeatedly. The cereal break should be a winter cereal, preferably winter rye. Overwintering crops (winter rape, winter turnip, Landsberger mixture), reduce the occurrence of the weed. Market garden and herbage crops should be repeatedly used in the rotation. Rotations for different local conditions are recommended.—D.B.

831 Chatterjee, R. N., and Raizada, M. B. **Corn cockle a poisonous seed in imported wheat.** *Indian Fmg* 1950, **11**, 226-8, pl. 1, illus.

An illustrated description is given of corn cockle, *Lynchnis githago*, a weed of wheat. The seeds of this plant, which are toxic to man and livestock, have been identified in consignments of wheat imported into India.—N.G.S.

832 Tidsskrift for Planteavl, Meddelelser fra Statens Forsøgsvirksomhed i Plantekultur. Almindelig Kvik. [**Couch grass.**] *Tidsskr. Planteavl* 1949, **53**, 181-4.

Control of couch grass (*Agropyron repens*) is helped by autumn cultivation and the early weeding of drill-sown crops. Quick-growing, strongly shading crops such as yellow mustard or hemp reduce the numbers and spread of the weed.—R.P.J.

833 Derose, H. R. **Crabgrass inhibition with O-isopropyl N-(-3-chlorophenyl) carbamate.** *Agron. J.* 1951, **43**, 139-42, bibl. 10. [Biol. Dept, Chem. Corps, Camp Detrick, Frederick, Md]

In pot experiments, applications of 0.5 and 1 mg. of O-isopropyl N-(-3-chlorophenyl) carbamate per lb. of soil inhibited the development of crabgrass (*Digitaria sanguinalis*) seedlings, without apparently affecting the growth of soyabean, pea, or cotton plants; rates of 2 and 5 mg. per lb. of the compound prevented the emergence of crabgrass seed, but affected soyabean, pea and cotton plants adversely. In similar circumstances O-isopropyl N-phenyl carbamate (IPC) applied at rates of 0.5 and 2 mg. per lb. of soil had no effect on crabgrass; applications of 5 mg. per lb. of soil markedly inhibited crabgrass growth, but did not affect cotton seedlings. O-isopropyl N-phenyl carbamate disappeared from the soil [soil type not stated] in 24 days, whilst O-isopropyl N-(-3-chlorophenyl) carbamate disappeared from the soil under similar conditions in not more than 56 days after application.—P.J.B.

834 Ocfemia, G. O., and Javier, S. V. Jr. **Experimental control of water hyacinth (*Eichhornia azurea*) in lowland rice fields with herbicides [in the Philippines].** *Philippine Agriculturist* 1950, **33**, 285-7, bibl. 1 in text.

835 Hagsand, E., and Åberg, E. **The effect of 4K-2M and 2,4-D weedkillers on *Galeopsis* spp. and *Spergula arvensis* L.** *Kungl. Lantbr-Högsk. Ann.* 1950, **17**, 37-44, bibl. 4.

Experiments were carried out to determine the effect of 4K-2M (Methoxone) and the amine salt and ester of 2,4-D on *Galeopsis* spp. and spurry (*Spergula arvensis*), at three locations in central Sweden. The results showed that 4K-2M was more toxic to both weeds than 2,4-D. The relationship between the growth substances produced by the plant and those applied in herbicides is discussed and the hypothesis is advanced that *Galeopsis* seedlings (which were less affected by spraying in May than were more mature plants sprayed in July) may produce growth substances which inhibit the effect of applied hormone derivatives.—P.J.B.

836 Buckley, T. A. **Notes on the control of trees and weeds by phytocides.** *Malay agric. J.* 1951, **34**, 27-31.

Lalang (*Imperata cylindrica*) is the major weed of Malaya. 10 lbs. per acre of sodium arsenite in solution [concentration not given] kills lalang above the ground, but as many as ten dressings may be required to achieve eradication. Sodium chlorate is less effective and more expensive. Lalang is totally resistant to all forms of 2,4-D and other growth control hormones tested [names not stated]. Dinitro-o-cresol and pentachlorphenol have been unsatisfactory. Sovacide, a mineral oil fraction, is promising. TCA has proved effective, but very costly. *Melastoma malabathricum* is usually controlled by slashing. Three sprayings with 2,4-D ester cause defoliation only. In grazings, cattle eat lalang, but not *M. malabathricum* which becomes a pest. *Mimosa pudica* thrives on grazing grounds: 2,4-D, while partially successful against it, is uneconomic. In pastures, periodic mechanical tearing out, gives the most successful control of *M. pudica*. *Gleichenia* can be controlled by slashing, sodium arsenite spraying, and burning. Nutgrass (*Cyperus rotundus*) is troublesome unless suppressed by taller growth. Hormone treatments, which only destroy the top growth, can have the reverse effect to that intended, for the nutgrass benefits from the destruction of competing species. Twenty-nine major weeds of irrigated rice are listed. Hormone weedkillers are not yet an effective and economic substitute for hand weeding, as many weeds are unaffected by them. Hormone weedkillers are ineffective against bladderwort (*Utricularia flexuosa*), *Enhydrias angustipetala*, *Chara gymnopitys*, and coarse water grass (*Hymenachne myuros*), which obstruct water courses. Copper sulphate may be effective against algae, but the danger of killing fish and fish food must be considered. A heavy dosage of 2,4-D ester gave complete control of water hyacinth (*Eichhornia crassipes*) in Kedah.—N.G.S.

837 **P**ELLEGRINI, G. Prove di lotta con erbicidi ormonici selettivi contro erbe infestanti il frumento. [**Control trials of wheat weeds with selective hormone herbicides.**] *Soc. gen. Montecatini, Serv. tec. agr. Quad.* No. 6. 1951, pp. 42, bibl. 32, fig. 19, French, English and German summaries, pp. 40-2.

Four field trials were carried out over 2 years in 1948 and 1949 in the province of Milan to test 2,4-D as a herbicide on autumn wheat crops. It was ascertained that heavy weed infestation can lower the yield of wheat by over 58 %. In two trials on heavily infested crops, the 2,4-D treatment increased grain yield (by 77 and 91 %), germination, hectolitre weight, and the weight of a 1000 seeds, as well as reducing the percentage of the weed seeds considerably. When 2,4-D treatment was given too early, or in an excessive dose, it damaged the wheat plants, lowered the grain yield and the weight of a 1000 seeds, but it did not affect to any considerable extent the germination capacity and the hectolitre weight. In the conditions of the trials, it appeared that a suitable period for 2,4-D treatment is from 15th March to 15th April, according to the development of wheat it is well to give treatment as late as possible during this period) and that the dose to be employed varies from 750 to 1000 grm. of 2,4- dichloophenoxyacetic acid per ha. according to the susceptibiltiy of the weeds present. *Vicia sativa*, *V. hirsuta*, *V. segetalis*, *Papaver rhoeas*, *Centaurea yanus* and *Arthemisia* sp. proved to be very suseptible to 2,4-D ; *Stellaria media* and *Veronica* sp. moderately susceptible and *Matricaria chamomilla* esistant.—E.B.

38 **I**LLINOIS Agricultural Experiment Station. Circ. 652. **Controlling weeds in corn with 2,4-D.** By *F. W. Slife* and others. 1950, pp. 16.

ractical information is given on the pre- and post-mergence spraying of maize and the types of amage caused by 2,4-D sprays in this crop. A able gives the rates of post-emergence 2,4-D pplication needed to control a number of common eeds of maize in Illinois.—P.J.B.

39 **K**ONDO, M. and **K**ASAHARA, Y. Untersuchungen der Unkrautsamen Japans. VIII. Leguminosae (1). [**Examination of weed seeds of Japan. VIII. Leguminosae** (1).] *Ber. Ōhara Inst. landw. Forsch.* 1942, **9**, 1-13. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Illustrated morphological descriptions are given of seeds of the following legumes : *Aeschynomone indica*, *Cassia mimosoides*, *Crotalaria sessiliflora*, *Desmodium racemosum*, *Dumbaria villosa*, *Falcata comosa*, *Glycine ussuriensis*, *Indigofera pseudotinctria*, *Lathyrus maritimus*, *Lespedeza bicolor*, *L. cuneata*, *L. pilosa*, *L. tomentosa*, *Lotus corniculatus*, *Microlespedeza striata*, *Rhynchosia acuminatifolia*, *Sophora angustifolia*, *Vicia hirsuta*, *V. sativa*, *V. tetrasperma* and *V. unifuga*.—D.B.

840 **K**ONDO, M., and **K**ASAHARA, Y. Untersuchungen über die Keimung der Unkrautsamen Japans. I. [**Examination of germination of weed seeds of Japan. I.**] *Ber. Ōhara Inst. landw. Forsch.* 1942, **9**, 14-21, bibl. 4. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Results of experiments on germination are given with particular reference to the effect of light and temperature. The seeds examined represented 26 families and 114 species and included members of the Gramineae and Leguminosae.—D.B.

841 **K**ONDO, M., and **K**ASAHARA, Y. Untersuchungen über die Keimung der Unkrautsamen Japans. II. [**Examination of germination of weed seeds of Japan. II.**] *Ber. Ōhara Inst. landw. Forsch.* 1942, **9**, 22-8. [Received 1950] [Ōhara Inst. Agric. Res., Kurashiki, Japan]

Lowering the temperature from 25°C. to 15°C. aided the germination of seeds of *Veronica arvensis*, *Sagina maxima*, *Alopecurus fulvus*, and *Prunella asiatica*.—D.B.

842 **E**VERSON, L. **Further studies on the effect of 2,4-D on seeds.** *Proc. Ass. Off. Seed Anal. N. Amer.* 1950, 84-7. [Iowa State Coll., Ames]

Studies were carried out to determine the extent of 2,4-D penetration of seed and the penetration of 2,4-D into seeds, or seed coats, when the treated seed was stored in moist peat soil. 2,4-D readily penetrated the seed coats of beans, maize and embryo-dormant giant ragweed (*Ambrosia trifida*), but did not penetrate the water-impermeable seed coat of butterprint (*Abutilon theophrasti*). Impermeable seeds of sweet clover and butterprint that were treated with 2,4-D and kept in moist peat for 7 weeks, contained no 2,4-D after removal from the peat ; water-permeable dormant, or non-dormant, seeds still contained 2,4-D after the same 2,4-D treatment and moist peat storage.—P.J.B.

843 **M**C**N**EW, G. L., and **H**OFFMANN, O. L. **The growth regulant, herbicidal and physical properties of 2,4-D and related compounds.** *Iowa State Coll. J. Sci.* 1950, **24**, 189-208, bibl. 23. [Bot and Plant Path. Sect., Iowa Agric. Expt Sta., Ames]

As a result of the demand for basic data on the chemistry of 2,4-D compounds, the essential data obtained in greenhouse tests in 1944 and 1945, with 53 2,4-D compounds on bean and tomato plants is presented and discussed.—P.J.B.

844 Bouillenne-Walrand, M. Considérations et expériences sur les herbicides 2,4-D et homologues. [**Experimental study of 2,4-D and homologous weedkillers.**] *Med. Landb-Hogesch. Gent* 1950, **15**, 128-53, English summary, p. 153. [Plant Hormone Res. Centre, Gent, Belgium]

2,4-D acid (pH 2.5) in a concentration of 2 grm. per litre appreciably reduced grain yield per hundred ears in oats, but did not affect that of wheat. Similar results were obtained from the sodium salts of the acids of 2,4-D, 2,5-D and 2,4,5-T in a concentration of 4 grm. per litre. The concentrations employed did not affect rooting. Effects vary not only in accordance with plant species and varieties, but also according to their stage of development.—G.M.R.

845 Wilson, J. R. W. **Field notes on use of the herbicide IPC.** *Agric. Chem.* 1951, **6**, 34-7 and 91-6. [Jack Wilson Chem. Co., Stockton, Calif.]

A summary of information so far obtained from field trials with IPC (isopropyl n-phenyl carbamate) is given. The growth regulating activity of IPC in different crops and weeds, the formulation of IPC and trials with new IPC derivatives are briefly noted. On sugar beet grown for seed, good rye grass control has been obtained following spraying with 50 % wettable IPC powder at rates of 5 to 6.4 lb. per acre of actual IPC, with no adverse effect on the sugar beet. In peas, pre-sowing spray applications of 1, 2 and 4 lb. of IPC per acre disced into the soil, resulted in seed yields of 860, 1040 and 1550 lb. per ac., with 43, 67 and 86 % control of wild oats ; untreated check plots yielded 580 lb. of seed per acre. There is some evidence to show that IPC has a stimulating effect on the growth of pea crops. Applications of 5 lb. of IPC per ac. to soyabeans reduced wild oat stands without harming the crop. In flax, good wild oat control has been obtained following spray applications of 2, 3 and 5 lb. of actual IPC per ac. before the majority of the oats had emerged and when the flax was at the 4-5 leaf stage. In safflower, 3 lb. of actual IPC per ac. gave complete control of wild oats and volunteer barley, when applied at the cotyledon stage of the safflowers.—P.J.B.

CROP BOTANY

846 Chevalier, A. Les flores et spécialement les plantes utiles de l'hémisphère austral et notamment de l'Océanie. [**The floras and especially the useful plants of the southern hemisphere and particularly of Oceania.**] *Rev. Bot. appl.* 1951, **31**, 38-50.

847 Olthoff, B. H. Kruisbestuivingsgevaar bij *Brassicas*. [**The danger of crossing between *Brassica* crops.**] *Maandbl. LandbVoorlDnst* 1950, **7**, 229-31, bibl. 2.

A list is given of the most important species within the *Brassica* family with their chromosome numbers and the Latin names of the varieties within the species. The species include : *Brassica nigra* (8 chromosomes) ; *B. juncea* (18) ; *B. oleracea* (9), 12 varieties listed ; *B. campestris* (10), 4 varieties listed ; and *B. napus* (19) 3 varieties listed. In this list, the *B. rapa* group name is replaced by *B. campestris*. The paper is intended to clarify the taxonomic position of *Brassica* varieties and is supplementary to a previous paper, for which see *Fld Crop Abstr.* 3 : 203.—P.J.B.

848 Schropp, W. Wasser-und Sandkulturversuche über die Wirkung Spurenelemente im Chilesalpeter. [**Water and sand culture experiments for studying the action of trace elements in chile saltpetre.**] *Z. PflErnähr. Dung.* 1950, **1**, 203-25, bibl. 9. [Süddeutschen Versuchs-und Forschungsanstalt für Milchwirtschaft, Weihenstephan]

An account is given of experiments conducted during 1937-40. The trace element influence in chile saltpetre was found to be due to boron.—D.B.

849 Bertramson, B. R., and others. **The effect of manganese and other minor elements on plants.** *Purdue Univ.* 63rd Ann. Rep. for year ending June 30, 1950. 1950, pp. 24-5.

Applications of 5 lb. per ac. of manganese sulphate to soyabeans, grown on Mn-deficient neutral muck soil, resulted in significant increases in the carotene content, the carotene-destroying enzyme activity and the tocopherol content of the leaves, and at the same time decreased the protein and choline content and the leaf-stem ratio of the plants, compared with untreated controls. Applications of 150 lb. per ac. of manganese sulphate resulted in the greatest increase in carotene content and approximately doubled the number of pods per plant, compared to untreated controls. Manganese-deficient and normal Clinton oats about 6 and 10 in. high, respectively, were sampled on the same day ; the carotene content of the normal oats was about three times that of the Mn-deficient oats.—P.J.B.

850 GERRETSEN, F. C. **Manganese in relation to photosynthesis. III. Uptake of oxygen by illuminated crude chloroplast suspensions.** *Plant and Soil* 1950, **2**, 323-43, bibl. 17.

851 ANDERSON, A. J., and SPENCER, D. **Molybdenum in nitrogen metabolism of legumes and non-legumes.** *Aust. J. sci. Res.* Ser. B. 1950, **3**, 414-30, bibl. 29. [C.S.I.R.O., Canberra]

Experiments were carried out to examine the effect of nitrate nitrogen on the response of plants to Mo, growing in four Mo-deficient soils and to compare the effects of Mo on the nitrogen metabolism of *Trifolium subterraneum*, *Linum usitatissimum* and *Avena sativa*. *T. subterraneum* responded to Mo on each of the four soils. Flax responded to Mo on only one of the soils in the presence of a heavy dressing of $MnSO_4$ and where N was provided in the form of HNO_3 and $(NH_4)_2SO_4$. The oats did not respond to Mo on any of the soils, even when $MnSO_4$ was added. Deficiency of Mo decreased the percentage protein nitrogen in both the flax and the clover. The percentage total nitrogen in flax was unaffected by Mo, but deficiency of Mo decreased the percentage protein nitrogen and increased the percentage non-protein nitrogen. Thus Mo was needed by the non-legume for the utilization of absorbed nitrate nitrogen.—From authors' summary.

852 ANDERSON, A. J., and SPENCER, D. **Sulphur in nitrogen metabolism of legumes and non-legumes.** *Aust. J. sci. Res.* Ser. B. 1950, **3**, 431-49, bibl. 38, pl. 4. [C.S.I.R.O., Canberra]

A study was made of the influence of sulphur on the nitrogen metabolism of subterranean clover (*Trifolium subterraneum*) and the following non-legumes: oats (*Avena sativa*), flax and linseed (*Linum usitatissimum*), and *Paspalum dilatatum*. All these species responded to fertilizers containing sulphur, on the three soils used. Sulphates of ammonium, potassium, sodium, and manganese were all effective. Non-legumes deficient in either sulphur or nitrogen were pale green and contained a lower percentage of protein nitrogen than the corresponding treated plants, which were dark green. Further, nitrogen deficiency decreased the percentages of non-protein nitrogen and total nitrogen. Sulphur deficiency increased the percentages of both non-protein and total nitrogen. High nitrate accumulation occurred in the sulphur-deficient plants where nitrate was the source of nitrogen. Thus sulphur was needed by the non-legumes for protein formation from the absorbed combined nitrogen. Nitrogen-deficient non-legumes responded little in colour or growth to sulphur. The sulphur-nitrogen yield interaction was positive. This abstract also appears in *Herb. Abstr.*—From authors' summary.

853 SCHARRER, K., and SCHROPP, W. Sand-und Wasserkulturversuche mit Selen und Tellur. [**Seed and water culture experiments with selenium and tellurium.**] *Z. PflErnähr. Dung.* 1950, **50**, 187-202. [Agric. Chem. Inst., Univ. Giessen, and Süddeutschen Versuchs- und Forschungsanstalt für Milchwirtschaft, Weihenstephan]

An account of researches carried out in 1935-36. In general, selenium was more poisonous to plant growth than was tellurium.—D.B.

854 GOLDSCHMIT, W. B. **The total sulphur content of some cultivated Lowveld soils and its probable relation to profitable crop production.** *S. Afr. J. Sci.* 1951, **47**, 261-2. [Subtrop. Hort. Res. Sta., Nelspruit]

855 BOISCHOT, P., and TYSZKIEWICZ, —, Absorption de l'arsenic par les plantes. [**Arsenic absorption by plants.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 678-9. [Received 1950]

Experiments were conducted to find out whether plants growing on soils treated with arsenic could harm animals. Sodium arsenate at over 400 kg./ha. arrested growth in rye, while 1000 kg/ha. caused barley to cease growth. The actual quantity of arsenic absorbed by the barley and rye was very small. This was insufficient to be harmful to animals.—K.O.

856 HECK, W. W., and BAILEY, L. F. **Chelation of trace metals in nutrient solutions.** *Plant Physiol.* 1950, **25**, 573-82, bibl. 13. [Univ. Tennessee, Knoxville]

The chemistry of chelation, which is one of the means of removing trace elements from nutrient solutions, is explained. The responses of plants to chelating agents has been studied in pea, bean and maize (amongst other plants) when grown in nutrient solutions. "Concentrations of chelating agents in which plants would grow did not chelate metal ions effectively, while concentrations of chelating agents which chelated effectively produced severe plant injury. This injury resulted from heavy metals being extracted from the root cells." The use of chelating agents in nutrient solutions in direct contact with the roots of growing plants is, therefore, not a feasible method of controlling trace metal contamination in nutrient solutions.—D.B.

857 NOVIKOV, G. N. [**The ecology of salt-resistant plants. 1. The effect of soil salinization on growth, water expenditure, and accumulation of pigments in halophytes.**] [Russian] *Trudy Komarov Bot. Inst.* Ser. 4. Experimental botany, Part 6, 1948, 200-17, bibl. 14. [Received 1950]

The investigation was made with *Salicornia herbacea*, *Suaeda prostrata*, *Atriplex cana* and a wheat variety, Saratovskaja 062, grown in pot cultures. Under the experimental conditions there was evidence that NaCl and Na_2SO_4 lowered chlorophyll content of all the plants; carotinoids were depleted in *A. cana*, but augmented in *S. herbacea*. A test with seedlings of the wheat variety showed that soil salinity did not invariably lower chlorophyll content in assimilatory tissues. The significance of the observations is discussed in relation to earlier literature which has bearing on the subject.—M.H.

858 GILLERN, C. Untersuchungen über die Wirkung des Laubdüngemittels "Assimilan" auf das Pflanzenwachstum. [**The action of the leaf manure "Assimilan" on plant growth.**] *Bodenkultur* 1950, **4**, 233-8. [Landw.-chem. Bundesversuchsantalt, Wien]

"Assimilan" is a manure applied to the leaf and consists essentially of plant nutrients and compounds of trace elements. The test plants used included *Zea mays*, the growth of which was improved by Assimilan. [See also next abstract.]—D.B.

859 POZDENA, L. Kritische Bemerkungen zur Frage der Laubdüngung. [**Critical observations on the question of leaf manuring.**] *Bodenkultur* 1950, **4**, 365-8, bibl. 2.

Leaf manuring is the supplying of additional soil nutrient substances to the leaf surface. A number of questions are asked concerning its mode of action. Is it a manure in the usual sense of the word, with the exception that the leaf rather than the root is the absorbing organ, or is it a stimulant which improves the assimilation process in the leaf? The author does not rule out the possibility that some of the manure might accidentally fall to the soil and so enhance nutrient supplies to the root or that the requisite bi-weekly spraying with water might itself improve the condition of the crop. [See also previous abstract.]—D.B.

860 RIVERA, V. Influenza della "carica metallica" della soluzione sull'attività metabolica di alcuni vegetali. [**Influence of the metallic charge of a solution on the metabolism of some plants.**] *Ann. Bot. Roma*, 1949, **23**, 139-56, English summary, p. 156. [Received 1950]

A series of trials was carried out at the above institute to study the effect of aqueous solutions of various salts at high concentration on plant metabolism. In the trial described, germinated seeds of *Lupinus albus* were grown in solutions of the chlorides of Hg, Pt, Cu, Fe, K and Na. By comparing the effect of these salts, which at certain concentrations inhibit the development in *Lupinus*, it was observed that (a) the lowest concentration of the salt which inhibits development varies with the various salts; (b) this inhibition of development depends upon the concentration of the positive (metal) ions of the salt and also upon the atomic weight of the metal. The product of the atomic weight of the metal by the lowest concentration of the salt inhibiting development is called the metallic charge. The metallic charge is about 200 for the chlorides of Hg, Pt, Cu, and Fe, and 800 for the chlorides of K and Na.—E.B.

861 HASLER, A., and MAURIZIO, A. Über den Einfluss verschiedener Nährstoffe auf Blütenansatz, Nektarsekretion und Samenertrag von honigenden Pflanzen, speziell von Sommerraps (*Brassica napus* L.). [**The influence of different nutritive substances on flower initiation, nectar secretion and seed yield from honey bearing plants, especially from summer rape (*Brassica napus* L.).**] *Schw. landw. Mh.* 1950, **28**, 201-11, bibl. 11. [Agrikulturchemischen Anstalt und Milchwirtschaftlichen Versuchsanstalt, Liebefeld-Bern]

The addition of magnesium and boron to complete fertilizer produced a longer flowering period than did complete fertilizer without these elements. Nectar secretion was closely linked with potassium manuring, the absence of which caused a marked decrease in nectar secretion. Flower production and seed yield were decreased by insufficiency of any one of these five nutrient elements. Seed setting was poor in potassium-deficient plants in spite of abundant flowering.—D.B.

862 DE CAPITE, L. Il pH delle soluzioni nutritive e la sua influenza sullo sviluppo dei vegetali. [**The pH of nutrient solutions and its influence on plant development.**] *Ann. Fac. Agr. Univ. Perugia* 1948, **5**, 135-45, bibl. 14. [Received 1951] [Ist. bot. Univ. Perugia, Italy]

Seedlings of oats, maize, rye, kidney bean and several wheat varieties, divided into groups, were placed in 5 different nutrient solutions having, respectively, pH values of 4, 5-6, 6-7, 6.9-7.2, and 7.3-8. The plants were examined seven days later. It was found that the optimum pH for all the wheat varieties was about neutrality (pH 6.9-7.2). At this pH value the wheat plants developed better, both in the aerial part and in the root, and weighed more than the wheat plants grown with a lower or higher pH. In oats, maize and rye, the best results were obtained with the nutrient solution at pH 6-7. Kidney beans gave the best results with the nutrient solution at pH 7.3-8. Although it is known that the plant tends to modify, through its roots, the pH of a nutrient solution by bringing it towards the optimum, the author is of the opinion that an unsuitable pH has a great influence on plant metabolism and that nutrient solutions having the optimum pH, for each plant, should be employed. —E.B.

863 ROBERTS, D. W. A. **Some effects of ethylene on germinating wheat.** *Canad. J. Bot.* 1951, **29**. 10-25, bibl. 17. [Bot. and Plant Pathol. Lab., Lethbridge, Alta]

Ethylene, at concentrations of 0.2 to 1.0 % in air, caused inhibition of the elongation of the shoots and roots of germinating wheat, without any inhibition of their rate of CO_2 emission. As judged by soluble and protein nitrogen determinations, the ethylene did not cause major disturbances in protein synthesis in the embryo, or translocation of nitrogenous substances. The dry weight of ethylene-treated embryos was similar to that of untreated embryos during the first five days of germination ; the treatment inhibited the water uptake of embryos during the 2nd, 3rd and 4th days of germination, but increased water uptake during the fifth day.—From author's summary.

864 BEĬLIS-VYROVAJA, R. A. [**The stimulating action of onion and garlic on the germination of wheat and rye grain in early phases of ripeness.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 393-6, bibl. 5. [Natural History Museum, Acad. Sci. USSR, Ljvov]

The volatile fraction from slices of onion and garlic bulbs has a stimulating effect on the germination of wheat and rye when applied to the grain at the phases of milk- and wax-ripeness, the stimulation from garlic bulbs being somewhat lower than that from onions. The tests were made with whole grain and also grain in which the pericarp had been slit : stimulation occurred in the grain of both groups.—M.H.

865 SIEGEL, S. M. **Effects of exposures of seeds to various physical agents. 1. Effects of brief exposures to heat and cold on germination and light-sensitivity.** *Bot. Gaz.* 1950, **112**, 57-70, bibl. 13. [Camp Detrick, Frederick, Md]

The results are of limited value in a strictly quantitative sense and are regarded as preliminary. Seed of *Digitaria sanguinalis*, *Sporobolus aeroides*, *Triticum vulgare*, *Linum usitatissimum*, *Phaseolus vulgaris*, *Raphanus sativus*, and *Zea mays* were conditioned at temperatures ranging between 10°C. and 100°C. for periods varying between 20 and 60 minutes. Half of the seeds were allowed to germinate in light, the other half in darkness. *D. sanguinalis* and *S. aeroides* exhibited a three-fold response to light. After conditioning at 10°C., germination percentage was higher in darkness than in light ; after conditioning at higher temperatures (50°C. or more), germination became relatively greater in light ; one case was light-obligate. Responses to light varied with differences in water content as well as with temperature of pre-treatment. Treatments which prevented germination in *S. aeroides* could be partially overcome by the addition of glucose, sucrose or hydroquinone, and in *D. sanguinalis* by light and/or glucose. *T. vulgare*, *L. usitatissimum* and *R. sativus* were the most resistant to heat treatment. The relative insensitivity of flax and radish seed over a wide range of temperature conditions may be related to the high oil content of these seeds. The protective action of the oils and an antioxidant function of the unsaturated fatty acids are put forward as explanations of the heat resistance of flax and radish seed.—D.B.

866 HILDITCH, T. P. **Biosynthesis of unsaturated fatty acids in ripening seeds.** *Nature, Lond.* 1951, **167**, 298-301, bibl. 27. [Dept Indust. Chem., Univ. Liverpool]

" The present state of our knowledge of synthesis of fats in vegetable seeds leads to the following conclusions. (1) Each species of plant elaborates its own specific mixture of acids in its seed fat ; but nearly all seed fats include considerable proportions of oleic and linoleic acids (with, in some cases, the triene linolenic acid or, in others, specific unsaturated acids of a different nature). (2) In seeds of the same species, the relative proportions of oleic and linoleic (linolenic) acids may vary considerably, and such variation is conditioned mainly by the temperature of the locality where the seed ripens. Low temperatures (and rate of development of the seed) tend to the production of a more unsaturated mixture of acids, and conversely. (3) This variation is confined to the *unsaturated* acids in the seed fat — in comparison, the *saturated* components show almost negligible variations in amount. (4) This suggests strongly that the typical *unsaturated* seed fatty acids are built up by a different mechanism from that which operates in the biosynthesis of the *saturated* acids. Moreover, the rate of the unsaturated acid synthesis *in vivo* is evidently much more affected by temperature than that of the synthesis of saturated acids. (5) In this article attention has been mainly directed to the possible theoretical implications of these features of seed fat production. Their bearing on agricultural practice in oil-seed crops is obvious."—Extract.

867 NASON, A. **The distribution and biosynthesis of niacin in germinating corn.** *Amer. J. Bot.* 1950, **37**, 612-23, bibl. 35. [Columbia Univ., New York, N.Y.]

The role of tryptophan and other substances as precursors of niacin has been studied in whole kernels and excised embryos of *Zea mays*. The average niacin content per whole kernel doubled during the first 10 days of germination in the high-niacin variety Tennessee 13. The increase occurred chiefly in the embryo while the endosperm lost niacin. It is suggested that the endosperm contains some substance which acts as a niacin precursor when translocated to the embryo. Tryptophan disapppeared from the embryo in quantities which were more than adequate for the synthesis of the amount of niacin in the embryo. (The author does not regard this as conclusive evidence for establishing tryptophan as the precursor.) Excised embryos of Tennessee 13 also synthesized niacin when fed tryptophan, but 3-hydroxyanthranilic acid was converted to niacin with even greater molar efficiency than was tryptophan.—D.B.

868 Maxwell, R. E. **Cytochrome oxidase in corn embryos.** *Plant Physiol.* 1950, **25**, 521-4, bibl. 12. [Iowa Agric. Expt Sta., Ames]

A method for establishing the presence of cytochrome oxidase in embryos of *Zea mays* is described.—D.B.

869 Hudjak, M. I. [**Formation of the aleurone grains in seed of *Linum* and *Ricinus*.**] [Ukrainian] *Bot. Ž.* 1949, **6**, No. 2, 32-8. bibl. 4, Russian summary, pp. 37-8.

870 Ball, E. **Influence of shoot apex on subjacent shoots of *Lupinus albus* L.** *Nature, Lond.* 1951, **167**, 36-7, bibl. 11. [Bot. Dept and Agric. Expt Sta., Univ. N. Carolina, Raleigh]

There is evidence that the shoot apex produces, and has a determining effect on, the differentiation of the subjacent tissues of the primary shoot in this plant.—M.H.

871 Brown, H. S., and Addicott, F. T. **The anatomy of experimental leaflet abscission in *Phaseolus vulgaris*.** *Amer. J. Bot.* 1950, **37**, 650-6, bibl. 11. [Univ. California, Los Angeles]

872 Levitt, J. **Toward a clearer concept of osmotic quantities in plant cells.** *Science* 1951, **113**, 228-31, bibl. 18.

873 Aronoff, S. **Chlorophyll.** *Bot. Rev.* 1950, **16**, 525-88, bibl. 243. [Iowa State Coll., Ames]

Certain fields of existing information concerning the chlorophylls are summarized under the following headings : types ; the natural state ; effect of radiation on chlorophyll in the plant ; chlorophyll in relation to plant composition and nutrition ; pathological aspects ; enzymes in chloroplasts ; joint activity of pigments ; optical activity ; reversible bleaching ; photochemical reduction by chloroplasts and grana ; photo-oxidations ; mechanism of formation of chlorophyll and related compounds.—D.B.

874 Weeks, D. C., and Robertson, R. N. **Studies in the metabolism of plant cells. VIII. Dependence of salt accumulation and salt respiration upon the cytochrome system.** *Aust. J. sci. Res.* Ser. B. 1950, **3**, 487-500, bibl. 18. [Bot. School, Univ. Melbourne (D.C.W.) and C.S.I.R.O., Homebush, N.S.W. (R.N.R.)]

875 White, P. R. **Neoplastic growth in plants.** *Quart. Rev. Biol.* 1951, **26**, 1-16, bibl. 133.

876 Adams, G. A., and Castagne, A. E. **Hemicelluloses of wheat straw.** *Canad. J. Chem.* 1951, **29**, 109-22, bibl. 29.

877 Flint, E. A. **The structure and development of the cotton fibre.** *Biol. Rev.* 1950, **25**, 414-34, bibl. 88. [Bot. Dept, Univ. Leeds]

The details of the structure of the cotton fibre (the literature of which is reviewed) are applicable not only to the study of cell walls in general, but they are also of significance in the interpretation of those properties which have technological significance. A section of the paper is concerned with literature on the theory of the deposition of cellulose by ellipsoidal particles.—M.H.

878 Bolli, M. Ricerche sulle vitamine. 3. L'influenza dell'acido ascorbico sul quoziente respiratorio nei vegetali superiori. 4. Particolari sulla funzione dell'acido ascorbico nei vegetali. Rapporti fra i carotinoidi e l'acido ascorbico. [**Research on vitamins. 3. The influence of ascorbic acid on the respiratory quotient in higher plants. 4. Particulars regarding the function of ascorbic acid in plants. Relations between the carotinoids and ascorbic acid.**] *Ann. Fac. Agr. Univ. Perugia* 1948, **5**, 51-69, bibl. 4, and 190-6, bibl. 11. [Received 1951] [Ist. bot. Univ. Perugia, Italy]

In a first series of trials germinated seeds of *Ricinus* and seedlings of *Triticum vulgare* var. Mentana were treated with solutions of vitamin C (ascorbic acid). The results showed that treatment with vitamin C increased the respiratory quotient in all cases. In another series of trials various plants, including *T. vulgare* var. Mentana and *Zea mays*, were treated with solutions of vitamin C. Results showed that treatment with vitamin C caused a greater oxidation of the respiratory substances, so that a smaller quantity of secondary products, such as oxalic acid, was formed. In carrot and cabbage plants treated with vitamin C solutions, a greater quantity of carotinoids were formed than in non-treated plants.—E.B.

879 Shaw, A. C., and Tatchell, R. T. **Distribution of vitamin C in the tip of the broad**

bean radicle. *Nature, Lond.* 1951, **167**, 116-7, bibl. 1. [Skinners' School, Tunbridge Wells]

880 Baumann, H. Wasserversorgung und Wurzelbildung. [**Water supply and root growth.**] *Dtsch. Landw.* 1948, **2**, 65-7. [Received 1950] [Berlin-Dahlem]

881 Trénel, M. Zur gutachtlichen Beurteilung der Grundwasserabsenkung auf den Ernteertrag im Löss. [**A contribution towards an authoritative evaluation of the effect of lowering the water table on yields in Loess soils.**] *Z. PflErnähr. Düng.* 1950, **49**, 224-37, bibl. 9. [Humboldt-Univ., Berlin]

Variations, obtained in different locations, in yields of sugar beet and of length of roots of cereals, peas, poppy, potatoes, lucerne and sugar beet are explained by physical properties of the soils.—D.B.

882 Levine, M. **Response of fibrous roots of sunflower and tobacco tissue cultures to plant growth substances.** *Bot. Gaz.* 1951, **112**, 281-9, bibl. [Montefiore Hospital, New York 67, N.Y.]

" Fibrous roots from tissue cultures of the sunflower (*Helianthus annuus* var. Russian) and tobacco (*Nicotiana affinis* and the hybrid *N. glauca* × *N. langsdorffi*) were grown *in vitro* in standard media to determine the effect of indoleacetic acid (IAA), chemical carcinogens (3,4-benzpyrene, 1,2,5-6- dibenzanthracene, and 20-methylcholanthrene), and coconut milk, all added singly or in combination, on these organs." IAA did not cause increase in root length. Instead, dark brown, jelly-like calluses were formed along the length of the excised root. New roots appeared from these calluses. In sunflower, differentiation of these calluses to complete plantlets (on removal from IAA medium) was not observed. Chemical carcinogens produced massive translucent roots. Coconut milk produced no changes in sunflower roots.—D.B.

883 Rice, E. L. **Effects of various plant growth-regulators on flowering in several crop plants.** *Bot. Gaz.* 1950, **112**, 207-13, bibl. 18. [Univ. Oklahoma]

The growth substances used were sodium 2,4-dichlorophenoxyacetate, sodium 2,4,5-trichlorophenoxyacetate and 4 chloro-o-toloxyacetic acid in concentrations of 0.1, 1.0 and 10 ppm. Plants investigated included the Wintok variety of *Avena sativa*, the Pawnee variety of *Triticum vulgare* and Evergreen variety of *Melilotus alba*. In no case was earlier flowering stimulated.—D.B.

884 New York State Agricultural Experiment Station. **The mechanism of growth hormone action in plant metabolism and the effect of hormone treatment on the composition of economic plants.** *New York State Agric. Expt Sta.* 69th Ann. Rep. 1950, pp. 12-13.

In experiments with young kidney bean plants, 2,4-D acid " tagged " with C^{14} in the carboxyl group was applied to the primary leaf of each plant. Samples of the plants were harvested 6 hrs, 2 days and 7 days after treatment. From 25 to 60 % of the C^{14} in the 2,4-D was absorbed by the plant, the greatest amounts being present in the hypocotyl and the first internode. A small amount of C^{14} was detected in the CO_2 respired by the plants and some had moved down into the nutrient solution on which the plants were grown. Most of the C^{14} in the plants was present in unchanged 2,4-D and in an unidentified substance which had some of the properties of a substituted phenoxyacetic acid.—P.J.B.

885 Dhillon, A. S., and Lucas, E. H. **Absorption, translocation and persistence of 2,4-dichlorophenoxyacetic acid in some plants.** *Bot. Gaz.* 1950, **112**, 198-206, bibl. 10. [Michigan State College, East Lansing]

Substantial evidence revealed that the roots of tomato, bean, corn, and oat plants are all capable of absorbing the sodium salt of 2,4-dichlorophenoxyacetic acid (2,4-D) from the soil. The absorbed chemical is translocated, probably in its original active form, into the aerial parts but further investigations will be necessary to identify the substance recovered. Attempts to extract and detect 2,4-D failed when it was applied in quantities of a few drops of a 1000-ppm. aqueous solution, or in equivalent amounts in the form of a paste, to leaves of tomato, bean, corn, and oat plants. The immersion of tomato and corn leaves in a 1000-ppm. solution of 2,4-D for 24 and 48 hours gave evidence that the growth regulator is absorbed and probably translocated as such. The tissue in which the translocation of the recoverable material takes place is suggested to be the xylem. —From authors' summary.

886 Muzik, T. J. **Movement of 2,4-D in soil.** *Agron. J.* 1951, **43**, 149-50. [Fed. Expt Sta., Mayaguez, Puerto Rico]

The results of experiments in which 2,4-D (5 lb. per ac.) was applied to silty-clay-loam soil, followed by the application of rainfall equivalents of 0.25, 0.5 and 1.0 in., indicated that the 2,4-D did not move down beyond the first 0.5 in., regardless of the amount of water applied to the soil surface, and regardless of whether the soil was saturated or relatively dry. On the other hand, similar experiments with TCA showed that this compound moved down to at least 8 in. below the soil surface following the application of the equivalent of 1 in. of rainfall. It is thought that the high lime and organic matter content of the soil used contributed to the immobilization of the 2,4-D.—P.J.B.

887 WIRWILLE, J. W., and MITCHELL, J. W. **Six new plant-growth-inhibiting compounds.** *Bot. Gaz.* 1950, **111**, 491-4, bibl. 3. [Bur. Plant Ind., Beltsville, Md]

Six organic ammonium compounds were found to inhibit internodal elongation of Black Valentine bean seedlings when applied to the stems or leaves. These ammonium compounds delayed blossoming of bean plants 3-10 days when applied in amounts of approximately 0.1 mg. per plant. One of the more active of these compounds (4- hydroxy-5-isopropyl-2-methylphenyl) trimethyl ammonium chloride, 1-piperidinecarboxylate, proved to be more effective in inhibiting stem elongation of bean seedlings than did either maleic hydrazide or 2,4-dichlorobenzylnicotinium chloride. —From authors' summary.

888 NAYLOR, A. W., and DAVIS, E. A. **Maleic hydrazide as a plant growth inhibitor.** *Bot. Gaz.* 1950, **112**, 112-26, bibl. 16. [Yale Univ., New Haven, Connecticut (A.W.N.) and Carnegie Inst. of Washington, Stanford, Calif. (E.A.D.)]

Maleic anhydride produces remarkably similar morphological responses in monocotyledonous and dicotyledonous plants. Though growth is inhibited at all stages, seedlings are more sensitive than adult plants. The usual sequence of symptoms is: (a) loss of apical dominance; (b) expansion of leaves already formed, often to a size greater than the controls; (c) production of a noticeably darker green colour than the controls; (d) increase in production of anthocyanin pigmentation; and (e) some chlorosis. Subseqent behaviour depends to a large extent upon the amount of maleic hydrazide given and to some extent upon the age of the plant and upon the species. Flowering was suppressed in *Helianthus annuus* and *Arachis hypogaea*, and the staminate flowers in *Zea mays* were sterile when the plant was treated at the time of microsporogenesis. Maleic hydrazide is considered to be a growth inhibitor rather than a hormone. Because of its uniform effectiveness as a growth inhibitor it is unlikely that it will be generally useful as a selective herbicide.—D.B.

889 CURRIER, H. B. and others. **Some effects of maleic hydrazide on plants.** *Bot. Gaz.* 1951, **112**, 272-,80, bibl. 22. [Univ. Calif., Davis]

Young barley plants sprayed with maleic hydrazide (MH) showed a smaller fresh-weight but greater dry-weight than untreated plants after 12 days. The increase in dry weight was due predominantly to accumulation of fructosan polysaccharides; sugars remained the same. 2,4-D (2,4-dichlorophenoxyacetic acid) partially antagonized the effect of maleic hydrazide on barley plants. MH interferes with translocation and the curvature effect of 2,4-D in the epicotyl of young bean plants. Either MH itself is translocated, or some secondary effect is transmitted from the leaf to the epicotyl. No evidence was obtained of abnormal callus formation on sieve plates as an effect of MH. In bean plants, starch accumulation is a visible response to MH treatment. Possible mechanisms of action of MH are discussed. [See also previous abstract]. —From authors' summary.

890 PLAYER, Mary A. **Effects of some growth regulating substances on the transpiration of *Zea mays* L. and *Ricinus communis*, L.** *Plant Physiol.* 1950, **25**, 469-77, bibl 5. [North-western Univ., Evanston, Illinois]

Transpiration was measured from fully-grown leaves. The growth-regulating substances indole-3-acetic acid, B-napthoxyacetic acid, P-chlorophenoxyacetic acid, 2,4-dichlorophenoxyacetic acid, B-(indole-3)-propionic acid and γ-(indole-3)-butyric acid) were sprayed on the upper and lower leaf surfaces. They had no effect on transpiration rate in *Zea mays*, but they decreased transpiration in *R. communis* in which the higher the concentration of the growth substance, the lower was the transpiration rate.—D.B.

891 NANCE, J. F. **Inhibition of nitrate assimilation in excised wheat roots by various respiratory poisons.** *Plant Physiol.* 1950, **25**, 722-35, bibl. 30. [Univ. Illinois, Urbana]

The effects of several commonly employed respiratory poisons on the complete assimilation of nitrate and the reduction of nitrate to nitrite by the excised roots of wheat seedlings were observed. Carbon monoxide in the dark does not inhibit the assimilation. Cyanide and iodoacetate inhibit both reduction of nitrate to nitrite and the complete assimilation of nitrate. Azide inhibits the complete assimilation of nitrate but its effects on the formation of nitrite cannot be observed directly because of the reaction between azide and nitrite.—From author's summary.

892 KENT, Martha, and GORTNER, W. A. **Effect of pre-illumination on the response of split pea stems to growth substances.** *Bot. Gaz.* 1951, **112**, 307-11, bibl. 12. [Pineapple Research Sta., Inst. of Hawaii, Honolulu]

Light has a marked effect on the response of the seedlings in the pea test for detecting growth-regulating activity of chemicals. Split stems from seedlings grown in complete darkness give little or no response to solutions of growth substances, while pre-illumination is effective in securing a response. The time of exposure and amount and quality of the light are all critical in obtaining maximal response. A pre-harvest exposure of the seedlings to red light greatly increases the curvature in the pea test and eliminates occasional batches which otherwise would not respond to growth substances. Although the reproducibility of the pea test still leaves something to be desired in assigning a numerical rating of activity to test compounds, the present study does indicate the importance of the factor of light in controlling responses.—From authors' summary.

893 Mitchell, J. W., and Linder, P. J. **Some methods used in tracing radioactive growth regulating substances in plants.** *Bot. Gaz.* 1950, **112**, 126-9, bibl. 1. [Bur. Plant Industry, Beltsville, Md]

In treating plants with isotopically tagged growth-regulators, it is often necessary to apply a measured volume of the solution containing the tagged compound to a known surface area on the plant. An inexpensive applicator made to hold radioactive solutions and mixtures in a pipette at a distance from the operator is described. As little as 0.01 ml. of solution can be readily delivered and placed on a plant with this apparatus. A simple method of plating samples of ground radio-active plant tissues on the tacky surface of cellophane is described. The method makes possible the measurement of ground tissue spread in an even layer essentially one particle in thickness. Evaluation of counts in terms of weight of the tagged compounds was accomplished by impregnating a plated sample of tissue with a known amount of the tagged compound.—Extracts from article.

894 Blanchard, F. A., and Diller, V. M. **Technique for growing plants with roots in a sterile medium.** *Plant Physiol.* 1950, **25**, 767-9, bibl. 6. [Univ. Cincinnati, Ohio]

895 Nilsson, P. E. **An improved device for aseptic cultivation of higher plants.** *Kung. LantbrHögsk. Ann.* 1950, **17**, 358-60, bibl. 2.

896 Malavolta, E. Dosagem rapida do fósforo no colorímetro fotoelétrico. [**Rapid phosphorus determination using a photo-electric colorimeter.**] *Rev. Agric. Piracicaba* 1951, **26**, 21-8, bibl. 4.

The following procedure is proposed for the determination of phosphorus in plant materials in the "E.E.L. portable colorimeter": digest 2 grm. of oven-dried plant material with 10-15 ml. of nitric acid in a hot plate until no signs of solid substance are visible (the product to be digested must be placed in a 250 ml. beaker covered with a watch glass); remove the beaker from the hot plate, add 5 ml. of concentrated perchloric acid, replace the watch glass and gently boil until clear and fuming with copious vapour of perchloric acid. Do not allow the solution to go to dryness. Add 25 ml. distilled water, bring to the boil and pass through a Whatman N. 42 filter paper to a 100 ml. volumetric flask. Wash the dehydrated silica with hot water to about 75 ml. Cool and dilute to volume. Pipette a suitable aliquot of the solution to a 100 ml. volumetric flask. Add 5 ml. distilled water, shake well, add 1.5 ml. of freshly prepared 1 % stannous chloride solution. Make up to volume, mix and after 15 minutes take the galvanometric reading using the red filter. The phosphorus content in the solution can be estimated by the regression equation.—Author's summary.

897 Arland, A. Kurzfristige Vorprüfung von Kulturmassnahmen nach neuem Verfahren. [**A new procedure for the quick preliminary testing of cultivation treatments.**] *Dtsch. Landw.* 1949, **3**, 81-5. [Leipzig]

Atanasiu, N. Die "Anwelkmethode" kritisch betrachtet. [**The wilting method examined critically.**] *Dtsch. Landw.* 1950, **4**, 11-13, bibl. 6. [Berlin]

Arland, A. Die "Anwelkmethode" kritisch betrachet. [**The wilting method examined critically.**] *Dtsch. Landw.* 1950, **4**, 13-16. [Leipzig]

A physiological method is described for determining fertilizer requirements and other soil treatments for crop plants, the criterion of measurement being the transpiration capacity of the plants. The first of these papers gives some experimental results while the two succeeding papers constitute a discussion on the method. (See also *Herb. Abstr.* 3, Abs. 242d.)—D.B.

898 Traub, H. P. **Non-moistureproof cellophane and cellulose acetate film for preserving herbarium specimens.** *Phytologia* 1950, **3**, 297-8. [US Plant Ind. Sta., Beltsville, Md]

MISCELLANEOUS

899 World Crops. **Aircraft and Australian agriculture.** *World Crops* 1951, **3**, 156-7, illus.

900 Portères, R. Vieilles agricultures de l'Afrique intertropicale. Centres d'origine et de diversification variétale primaire et berceaux d'agriculture antérieurs au XVI^{e} siècle. [**Ancient agricultures of intertropical Africa. Centres of origin and of primary varietal diversification and cradles of agriculture previous to the 16th century.**] *Agron. trop.* 1950, **5**, 489-507, bibl. 18, fig. 8,

[Muséum d'Histoire naturelle, Paris]

The principal crops of tropical Africa are reviewed with regard to the geographical origin of species and varieties and the primary centres of cultivation. The "Delta Central" of the Niger in the French Sudan is the original home and first cultivation centre of *Oryza glaberrima*. *O. sativa* was introduced into West Africa from Asia by the Portuguese in the 16th century and its cultivation developed at first only in those areas where *O. glaberrima* was grown. In East Africa and Madagascar, rice (*O. sativa*) was introduced from Asia. *Sorghum* and *Pennisetum* millets have an African origin. The problem of the origin of *Eleusine coracana*, which is grown in Africa and Asia, has not yet been solved completely. Other crops considered are *Digitaria exilis* and *D. iburua*, *Dioscorea* spp., *Coleus* spp., *Hyptis spicigera* and *Sesamum indicum*. It is concluded that West Africa is a far more important centre of origin of agriculture than is East Africa. In Madagascar there is no ancient agriculture and all the crops at present grown there have been introduced from other countries. Fifteen maps illustrate the original centres and the present areas of cultivation of various crops.—E.B.

901 SCHON, A. **Atlas of Denmark. Text and photographs. Pt. 1. The landscapes.** 20 × 29, pp. 130, 1940. [Received 1950]

902 BERNSTEIN, Elizabeth H. **Farming in Southern Rhodesia. A bibliography.** 1949, pp. 30. [Mimeographed] [Received 1951]

903 ARNHEIM, J. **Swaziland. A bibliography.** 1950, pp. 25. [Mimeographed]

904 URUGUAY, Ministerio de Ganaderia y Agricultura, Direccion de Agronomia. Publ. No. 102. Recopilacion de la estadistica agropecuraria del Uruguay. [**Summary of Uruguayan agricultural statistics.**] Montevideo, 1950, pp. 168.

905 HOWARD, H. W. **Crops and plant breeding.** *J. roy. agric. Soc. England* 1950, **111**, 129-39, bibl. 36. [Plant Breed. Inst., School of Agric., Cambridge]

This article, included in the "Farmer's guide to agricultural research" section of the journal, deals amongst other things with new varieties and variety tests of cereals, sugar beet, and chemical weed control. The bibliography gives references to recent works.—E.B.

906 MEIJERS, P. G. Beschouwingen over de vruchtbaarheid van de grond. [**Some observations on the fertility of soils.**] *Maandbl. LandbVoorlDnst.* 1950, **7**, 218-21 [Rijkslandbouwconsulent, Noordelijk Groningen]

Data are given from trials, in Holland, over a 15-year period in support of the necessity for using organic matter, green crops and compost in the manuring of crops. On limed Dolland clay, the average yield increases from fields receiving farmyard manure every 4th year over unmanured fields were: wheat 2 to 3 %, spring barley 5 to 10 %, sugar beet 1 to 5 % and peas 5 to 25 %. On sandy clay soils, continuous wheat yielded an average of 2700 to 3400 kg. per ha., a root/wheat rotation 3000 to 3600 kg. of grain per ha. and a clover/wheat rotation 3500 to 4200 kg. of grain per ha. A table gives the rates and times of sowing, dry-matter yields and total and effective N yields per ha. for the chief green manuring crops used on clay and sandy clay soils.—P.J.B.

907 KLITSCH. Jahreswitterung und Jahresernte. [**The year's weather and the year's harvest.**] *Dtsch. Landw.* 1949, **3**, 50-8. [Freidrich-Schiller Univ., Jena]

There are four periods in the year which influence crop harvests: (1) November-February, the dormant period for vegetation but important to the crop because weather conditions determine the physical texture of the soil and its permeability; (2) March-April, the period of tillage; (3) May-June, the growth period during which the weather is critical for cereal yields; (4) July-August, during which root crops fill out. (September is also important for root crops because the weather determines the dry-matter content.) In this particular article, these four periods and their effects are illustrated by the harvests of 1947 and 1948 in the neighbourhood of Jena.—D.B.

908 GESLIN, H., and HALLAIRE, M. A propos de la lutte contre les gelées de printemps. Observations microclimatiques en Champagne. [**Control measures against spring frosts. Microclimatological observations in Champagne.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 705-8.

909 GERM, H. Über einige grundsätzliche Fragen der Gesundheitsprüfung des Saatgutes. [**Some fundamental questions on the testing of the health of seeds.**] *Bodenkultur* 1950, **4**, 28-34. [Bundesanstalt für Pflanzenbau und Samenprüfung, Wien, Austria]

After a short account of the history of seed analysis in Europe, the two types of seed examination are considered, those for determining the constitututional health of the seeds and those for measuring parasitic infection.—D.B.

910 PORTER, R. H. **Treatment of crop seeds in Brazil and Paraguay.** *Phytopathology* 1951, **41**, 367-74.

In trials with Arasan, Phygon, Granosan, Ceresan, Spergon and Semesan Jr., seed treatment of maize gave significantly higher germination percentages only when the seed was sown in the winter months of June, July, or August. Treated wheat seed sown in May or June in moist peat soil was markedly benefited in terms of germination and yield. The germination of hulled groundnut seed was considerably increased by seed treatment, compared to that of untreated seed, but that of rice, bean and sorghum seed was not significantly affected by treatment.—From author's summary.

911 PLANT PROTECTION ADVISER TO THE GOVERNMENT OF INDIA. **Plant protection work in India during 1949**. *Indian Fmg* 1950, **11**, 243-5.

This is a review of the large-scale aspect of insect and disease control on Indian crops during 1949.—N.G.S.

912 QUEENSLAND Department of Agriculture and Stock, Division of Plant Industry. Bull. No. 45. (N.S.) **The yellow-winged locust, *Gastrimargus musicus* Fabr., in central Queensland.** By *I. F. B. Common*. 1948, pp. 67, bibl. 26.

Bran baits poisoned with 0.06 % gamma isomer of BHC as the toxic ingredient and made palatable with molasses have proved efficient in controlling this locust, a dangerous pest of pasture and agricultural crops. A mixture of 15 oz. of a 15 % BHC mayonnaise emulsion, 4 lb. molasses, 2.5 gal. water and 24 lb. bran was compared with the standard bait containing 0.5 lb. arsenic pentoxide, 4 lb. molasses, 2.5 gal. water and 24 lb. bran. Observations 24 hr. after treatment showed a 90 % kill with the BHC mixture but only a 50 % kill with the arsenical bait. Other control measures, including spraying and dusting with DDT, are described. This abstract also appears in *Herb. Abstr.*—K.O.

913 WORLD CROPS. **Progress with systemic insecticides.** *World Crops* 1951, **3**, 148, illus.

914 IOWA Agricultural Experiment Station. Spec. Rep. No. 5. **Random arrangements for lattice designs.** By *M. A. Clem* and *W. T. Federer*. 1950, pp. 151.

915 SAUGER, L., and TOURTE, R. Contribution à la technique des essais culturaux au Sénégal. Forme et dimensions des parcelles. Nombre de répétitions. [**A contribution to the technique of cultural trials in Senegal. Shape and size of the plots. Number of repetitions.**] *Agron. trop.* 1951, **6**, 29-37, graphs, tables.

The soil of tropical regions is considered to be very heterogeneous. From tests carried out for 2 years in Senegal with *Arachis hypogaea* and *Pennisetum typhoideum* on soils and zones of different fertility and homogeneity, it appeared that the area of the unit plots under annual crops should be at least 75 sq. m. and that 8 to 10 or else 5 to 6 repetitions should be made, according to the degree of precision required.—E.B.

916 KOCH, E. J., and RIGNEY, J. A. **A method of estimating optimum plot size from experimental data.** *Agron. J.* 1951, **43**, 17-21.

917 SANDELIUS, M. **On non-sequential estimation when the sample size is a random variable.** *Kungl. LantbrHögsk. Ann.* 1950, **17**, 400-6, bibl. 3.

REVIEWS AND REPORTS

REVIEWS

918 PEACHEY, R. A. **Cereal varieties in Great Britain.** 25× 19, pp. 202, London: Crosby Lockwood and Son, Ltd., 1951, 21s.

The contents of this book by R. A. Peachey comprise an illustrated descriptive record of cereal varieties commercially grown in Britain at the present time. It brings together for the first time descriptive details of varieties which were hitherto scattered in various publications. At a time when the farmer is confronted with a long list of varieties from which to select, this book serves as a useful guide and reference book for all concerned with the production of cereals in this country.

The whole book is attractively set out. Varietal descriptions are accompanied by photographs of representative cereal heads. Each of the three sections on wheat, oats and barley is introduced by an opening chapter providing general information about the crop, which is followed by a discussion on the various factors to consider when selecting varieties for cultivation and an outline of the principal characters used for identification purposes.

A great deal of careful work over a period of years is needed for the production of a book of this kind, and even then it is hardly to be expected that the descriptions given will be universally accepted. For example, Radnorshire Sprig oat is not normally considered by the reviewer to possess good resistance to grain shattering; in fact, susceptibility to shattering is considered to be one of the defects of this variety. Then there is the question of omissions; for example, no reference is made to Hen Gymro wheat, to the Swedish spring oat variety

Englebreckt, or to Hen Gymro barley.

While one appreciates that descriptions of no less than 67 varieties of wheat, 61 varieties of oats and 18 varieties of barley are given in this book, it makes one appreciate all the more the magnitude of the task of the National Institute of Agricultural Botany in assessing the true value of all these varieties and the necessity for the Recommended List of Cereal Varieties as now published by the N.I.A.B. It is a great pity, therefore, that this most important N.I.A.B. information has been omitted from Dr. Peachey's publication. The inclusion in this book of such information would have presented a more complete picture of the true agronomic value of the different varieties described.—D. J. Griffiths.

919 **Africa.** British African Land Utilization Conference. Jos, Nigeria, November 7th-15th, 1949. Final report. Colonial Office, London, 1951, pp. 52.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

920 **Tanganyika.** Department of Agriculture, Annual Report for 1948. Dar es Salaam, 1950, pp. 173.

INVESTIGATIONS REPORTED:

1. Cotton variety and strain trials at Ilonga, p. 28.
2. Trials with gammexane dust and DDT against American cotton bollworm *Heliothis armigera*, pp. 29 and 163.
3. Rotation trials with grasses, legumes, cassava, and cotton, p. 83.
4. Effect of N, P and K applications on cotton yields, p. 84.
5. Comparison of cotton yields when grown on tied and untied ridges, p. 84.
6. Comparison of cotton and millet yields when grown on split and unsplit ridges, p. 84.
7. Selection for high-yielding strains and varieties of rice, pp. 30 and 84.
8. Trials to ascertain the best treatment of rice-lands after harvesting and before sowing the next crop, p. 30.
9. Manurial trials with rice, p. 154.
10. Observations on the milling, strength of straw and grain-shattering characters of fifteen selections of the rice variety Kahogo, pp. 154-5.
11. Comparison of the yields from the seven rice varieties: 2/16, Maji Maji 1/18, Afaa Mwanza Kahogo, 2/9, and 2/8, p. 155.
12. Comparison of grain yields from pre-soaked rice seed broadcast in 2 in. of water with yields from rice transplanted in the ordinary way, pp. 155-6.
13. Trials of a new series of wheats bred for short season conditions, pp. 31 and 102.
14. Trials to find wheat varieties exhibiting the characters of strength and distensibility for bread making, p. 95.
15. Effect of a 3 year rotation of elephant grass (*Pennisetum purpureum*), pigeon pea, or continuous maize on the subsequent maize crop, p. 29
16. Effect on stalk borer infestation of DDT dust and gammatox solution applied in the leaf funnel of maize, p. 29.
17. Effect of tied and untied ridges on the yield of maize, p. 84.
18. Control of armyworms (*Laphygma* spp.) by a 50 : 50 mixture of 5 % DDT and 0.5 % gamma BHC, applied by dust-guns at the rate of 15 to 20 lb. per ac. to 4 ft. high maize, p. 162.
19. Trials with the linseed variety Punjab, pp. 30 and 98.
20. Trials with flax varieties, p. 98.
21. Trials with cassava varieties resistant to brown streak. The varieties Ankrah, Aipin Valenca and 4026/20 remained free from infection, p. 43.
22. Trials with cassava varieties resistant to mosaic, pp. 74 and 156.
23. Selection of 255 sunflower strains made for length of maturity and size of head, p. 156.
24. Sorghum varietal trials, pp. 152-3.
25. Effect of clean weeding of sorghum at fortnightly intervals on the control of witchweed, *Striga* sp., p. 153.
26. Selections made of *Eleusine* and *Setaria* millet, p. 156.
27. Selections taken from various legumes, p. 156.
28. Trials of Derris, DDT and Gamatox [amounts not specified] to control the white stalk borer *Busseola fusca* of cereals, pp. 161-2.—K.O.

921 **French Africa.** L'activité de l'IRCT pendant la campagne 1948-1949. [The activity of the Institut de Recherches du Coton et des Textiles exotiques during 1948-1949.] *Cot. Fib. trop.* 1950, **5**, 45-68.

An account is given of the activity of the various IRCT centres and experimental stations in France and in French North, West and Equatorial Africa. Among the investigations reported are the following:

1. A trial in North Africa to study the effect of spacing on earliness and yield in the cotton variety Pima 67 intercropped with *Hibiscus esculentus*, p. 52.
2. A trial in West Africa with the cotton variety N'Kourala to investigate the relation between sowing date and spacing, p. 56.

3. *Hibiscus cannabinus* trials. At the Tikem Station (Chad) this crop gave promising results, p. 58.
4. Trials with cotton varieties in West and Equatorial Africa, pp. 56, 58, 59, 63, 64 and 65.—E.B.

922 **India.** Scientific Reports of the Indian Agricultural Research Institute, New Delhi, for the year 1947-8, [n.d.], pp. 182. [Received 1951]

INVESTIGATIONS REPORTED:

1. Manurial experiments, pp. 30-41. The value of sunn-hemp (*Crotalaria juncea*) as a green manure was greatest when it was grown and buried *in situ*. Under conditions at New Delhi, there are indications that the effects of green manuring last for more than one season.
2. Mixed cropping, pp. 41-2.
3. Cultural experiments, pp. 42-3. Late sowing and wide spacing appear to be conducive to high yields of gram (*Cicer arietinum*). Ploughless cultivation and 'enzymic manuring' gave significantly less yields than normal cultivation and manuring.
4. Flood-water farming, pp. 43-4. Yields were higher than from rain-fed crops.
5. Cultivators' holdings, p. 44. Yields were higher with green manuring than without it.
6. Agronomical experiments at Karnal Agricultural Research Sub-station, pp. 48-55. Experiments reported include:—manurial trials of rice, berseem, wheat and maize, and a flood-water farming experiment.
7. Fertilizer trials at Pusa, pp. 57-65.
8. Drought resistance in wheat, pp. 79-82. In a series of pot experiments with ten varieties, N.P. 52, N.P. 710, and CPH. 47 were relatively drought resistant. It is suggested that the greater drought resistance of N.P. 710 may be due to the high assimilatory activity of its ear. Seeds of N.P. 4 pre-treated with water and dilute salt, gave no increased yield.
9. Plant hormones, pp. 82-3. Seeds of the wheats *T. vavilovi* and *T. dicoccum* var. Khapli contain auxin in the free state. Pre-treatment with indolyl acetic acid had no effect on *T. vulgare* var. N.P. 165 or *T. polonicum*.
10. Fluorescein, p. 83. Application of 1.5 ppm of fluorescein on wheat increased grain yield by about 70 %, mainly by increasing the number of ear-bearing tillers.
11. Complete fertilizing of wheat and maize rotation (with and without legumes), pp. 102-5.
12. Micronutrient studies, p. 118.—N.G.S.

923 **Australia.** Commonwealth Scientific and Industrial Research Organisation. Second Annual Report for the year ended 30th June 1950. Sections I-XXXV, separately paged. [Advance copy, mimeographed]

INVESTIGATIONS REPORTED:

1. Analysis of oats grown in pot-culture experiments to determine the relationship of growth stage in oats to the Mn, Cu and Mo content of the plant materials, III, p. 4.
2. Trials with oil-seed crops including linseed, groundnuts, rapeseed, sunflower and safflower, III, pp. 17-8.
3. Trials on the suitability of guar (*Cyamopsis tetragonoloba*) as a green manure and fodder crop, III, p. 18.
4. Trials with the introduced oat varieties Frazier, Fulwin and Trojan for winter grazing and grain yields, III, p. 18.
5. The influence of rainfall on wheat yield in South Australia, III, p. 32.
6. The effect on soil salts of the water used on virgin land for rice production, IV, p. 2.
7. Varietal trials with *Lathyrus ochrus*, IV, p. 6.
8. Irrigation frequency trial with cotton, IV, p. 9.
9. Trials with rust-resistant varieties of flax, XVI, p. 1.—K.O.

924 **Fiji.** Department of Agriculture. Annual Report for 1949. Suva, [n.d.], pp. 39. [Received 1951]

INVESTIGATIONS REPORTED:

1. Weed control, p. 18.
2. Rice variety tests, p. 28. Of eleven varieties tried, New Guinea yielded best, both for early and late plantings.
3. *Urena lobata* trial, p. 28.
4. Insects of rice, p. 33. The standard Paris Green bait, DDT., and Chlordane baits proved ineffective against *Cirphis unipuncta*.
5. Insecticide trials, p. 34.—N.G.S.

925 **Hawaii University** Agricultural Experiment Station. Report for the Biennium ending June 30, 1950. Honolulu, 1951, pp. 173.

INVESTIGATIONS REPORTED:

1. The decomposition and residual effect of ammonium thiocyanate in soils. By Y. Kanehiro, pp. 15-16. In four different soil types under optimum moisture and aeration conditions, ammonium thiocyanate was not detectable two months after applications, but in soils lacking optimum aeration and moisture, this compound persisted in toxic amounts indefinitely.
2. Underground pipe distribution of irrigation water. By R. T. Tribble, p. 30.
3. Green manuring and cover crops. By O. R. Younge and M. Takahashi, pp. 47-8. A list is given of the adapted and potentially useful green manure and cover crops for Hawaii.—P.J.B.

926 **Alberta.** Fort Vermilion Dominion Experimental Substation. Progress Report 1939-1948. Ottawa, 1950, pp. 40.

INVESTIGATIONS REPORTED:

1. Spring wheat trials, p. 11. Two-year yield averages were headed by Thatcher, with 48.0 bu.

per ac., followed by Red Bobs, 43.1, Regent 42.8. and Saunders 41.7 bu. per ac. Thatcher and Saunders have become the standard varieties.
2. Oat trials, pp. 11-13. In ten years' trials, Victory has outyielded all other varieties and has established itself as the standard, medium late maturing variety for northern Alberta.
3. Barley trials, pp. 13-15. O.A.C.-21 is the recommended malting variety and Olli and Newal the feeding varieties. Plush has outyielded all other varieties over an 8-year period, but is very susceptible to lodging in wet years.
4. Flax trials, p. 15. Redwing continues as the recommended variety.
5. Field pea trials, p. 15. During a 10-year period, Chancellor and Early Blue have given yield averages of 39.3 and 39.9 bu. per ac., respectively. Early Blue lacks a desirable straw length and Chancellor is the recommended variety. Arthur gave a yield average of 39.5 bu. per ac. over the same period, but was late enough to suffer occasional frost damage.
6. Swede, mangold and carrot trials, pp. 21-2. Recommended varieties and average yields per ac. were: swedes, Acadia 26.7 tons, Laurentian 26.3 tons; mangolds, Prince White Sugar 22.2 tons, Frontenac 19.1 tons; carrots, Oxheart 15.3 tons.
7. Crop rotation studies, pp. 23-6. Two rotations have proved valuable in terms of economic returns and the conservation of soil fertility. They are: (1), summer fallow/wheat (seeded to alfalfa-brome grass mixture)/hay/hay/hay (broken up in early July after removing hay crop)/coarse grains/coarse grains; and (2), a rotation for the alfalfa seed producer, small grains/small grains undersown to alfalfa/hay/alfalfa seed/alfalfa seed/alfalfa seed (broken up after harvest).
8. Weed control by cultivation practices, p. 26.—P.J.B.

927 **Prince Edward Island.** Charlottetown Dominion Experimental Station. Progress Report 1937-1947. Ottawa, 1949, pp. 68. [Received, 1950]

INVESTIGATIONS REPORTED:
1. Rotations and soil fertility, pp. 24-8. Average yields from the following rotations are given: potatoes/wheat/clover/timothy; mangels/oats/clover/timothy/oats; swedes/wheat/clover/3-years' timothy/oats. Details are given of manurial treatments in these rotations.
2. Methods of applying farmyard manure, pp. 28-31. See Abs. 822.
3. Plant-food deficiency studies, pp. 43-4.
4. Swede trials, pp. 54-6. Ditmars and Laurentian have given the highest average fresh-weight yields, but were completely lacking in resistance to club-root (*Plasmodiophora brassicae*). In club-root resistance trials, Wilhelmsburger was outstandingly resistant, followed by a Charlottetown selection o Bangholm.
5. Mangel trials, p. 56. Prince has given the highest average root yields per ac., but has been rather low in dry-matter content and has not stored as well as Frontenac and Tip Top. Tip Top has small roots with a high dry-matter content and in dry-matter yields per ac. has compared well with Frontenac and Prince.
6. Oat trials, pp. 58-9. In trials during 1944 to 1947, Abegweit (Vanguard × Erban cross) gave the highest average yield of 69.2 bu. per ac., followed by Erban with 65.4, Beaver, with 63.3, Victory with 62.6 and Alaska 59.8 bu. per ac. Abegweit is replacing Erban as a standard variety.
7. Wheat trials, pp. 59-60. Notes are given on Coronation, Coronation 2, Regent and Cascade.
8. Barley trials, p. 60. Charlottetown headed the 10-year yield averages, with 40.4 bu. per ac., followed by Olli with 39.8, Byng with 35.7 and O.A.C.-21 with 33.4 bu. per ac. Olli yielded well, but has a very short straw for combining. Olli averaged 9 to 14 days earlier in maturity than the other three varieties tested.—P.J.B.

928 **New Hampshire** Agricultural Experiment Station. Sta. Bull. 382. Annual Report for 1949. Durham, 1949, pp. 47. [Received 1951]

INVESTIGATIONS REPORTED:
1. Silage and grain maize trials. By L. J. Higgins, pp. 14-6. The hybrid Cornell 29-3 has given high yields used either as an early silage or as a late grain variety. Wisconsin 692, a dent hybrid, has given outstanding yields over four seasons as a late silage variety. At Durham, two Connecticut A.E.S. sweet-dent hybrids gave yield averages of over 10,000 lb. dry matter per ac. Among grain varieties the medium early Wisconsin hybrids of the 200, 300, and 400 series and Mass. 62 have yielded well.
2. The control of European corn borer with DDT. By J. G. Conklin, p. 22.
3. The use and limits of 2,4-D for weed control. By P. T. Blood and F. S. Prince, p. 30.
4. The use of TCA for the control of quackgrass [*Agropyron repens*]. By A. R. Hodgdon, p. 31. On light sandy soil an almost complete kill of *A. repens* was obtained after spraying with a solution of 0.25 lb. of TCA in 1 gal. of water per 100 sq. ft. On heavier soils, 0.5 to 0.75 lb. of TCA was needed to obtain the same degree of control. On heavy soils, the residual effect of TCA appeared to last for a month to six weeks.—P.J.B.

929 **New York State** Agricultural Experiment Station. 69th Annual Report 1950. Geneva, 1950, pp. 51.

An investigation is reported on the mechanism of growth hormone action in plant metabolism and the effect of hormone treatment on the composition of economic plants. By F. P. Boyle and others, pp. 12-13. See Abs. 884.—P.J.B.

930 **Purdue University** Agricultural Experiment Station. 63rd Annual Report for year ending June 30, 1950. Lafayette, 1950, pp. 150.

INVESTIGATIONS REPORTED:

1. Breeding for resistance to maize leaf blight. By A. J. Ullstrup, p. 9.
2. Hessian fly (*Phytophaga destructor*) and disease-resistant wheat. By R. M. Caldwell and others, p. 12. A number of soft red winter wheats with high resistance to leaf rust, extreme earliness and high yields have been developed. Crosses have been made between Durum wheats resistant to *P. destructor* and a number of the above mentioned soft red winter wheats in the hope of combining resistance to leaf rust and *P. destructor* with high yields.
3. Blackhawk soyabeans. By G. H. Cutler and A H. Probst, p. 12. Blackhawk, a new, early maturing soyabean has outyielded Earlyana and Mandarin by an average of 3 and 4 bu. per ac., respectively, during the last 4 years on the muck soils of northern Indiana, to which it is adapted.
4. Wheat, oat and tobacco tests. By R. R. Mulvey and G. H. Enfield, p. 19. Seneca, a wheat closely related to Thorne, which has been a standard variety in Indiana for a long period, yielded 42.0 bu. per ac. in 1949 trials, compared to 39.8 bu. per ac. for Thorne. Both wheats are very similar, except that Seneca has a higher 1000-grain weight than Thorne. Benton and Mo. 0-200 (selection from Columbia × Bond-Iogold cross) headed oat yield trials in 1949. C.I. 5013 and other Clinton selections also yielded well.
5. A comparison of three cropping rotations. By R. R. Mulvey and G. H. Enfield, p. 20. The rotations under study are: 1. maize, wheat, clover; 2. maize, timothy; 3. maize, soyabeans, wheat, clover.
6. Fertilizer placement studies with maize. By A. J. Ohlrogge and others, p. 21.
7. The effect of manganese and other minor elements on plants. By B. R. Bertramson and others, pp. 24-5. See Abs. 849.
8. The use of electrocutor traps for corn-borer control. By H. O. Deay and J. G. Taylor, pp. 36-8. See Abs. 62.
9. Low gallonage insecticide applications and maize yields. By R. T. Everly, pp. 38-9. Of a number of different insecticides applied in 15 gal. of water per ac. at 40 lb. per sq. in. spray pressure, 1 lb. of wettable Parathion, 2 lb. colloidal DDT and 2 lb. DDD emulsion per ac. gave the best corn-borer control, with population reductions of 74.7, 72.6 and 70.3 % below that of the untreated controls.
10. Tests with new insecticides on various insects. By G. E. Gould, p. 39. Notes on aldrin, dieldrin and CS-645A are given. Against blister beetles (*Epicauta* spp.), dieldrin and CS-645A were reported to be outstanding [no details given].
11. The germination of maize seed stored under low temperature conditions. By A. M. Brunson, p. 103. Seed with 11 % or less moisture when stored at constant temperatures of 40°F or below, and kept in moisture-proof containers, germinated nearly as well after 10 years' storage as new seed. —P.J.B.

931 **Virginia** Agricultural Experiment Station. Report for the period July 1, 1947 to June 30, 1949. Blacksburg, 1949, pp. 96. [Received 1951]

INVESTIGATIONS REPORTED:

1. Groundnut breeding and testing. By E. T. Batten, p. 31.
2. Placing fertilizer in the rotation in the groundnut area. By E. T. Batten, p. 32.
3. Time to apply nitrogen to maize on a heavy clay soil. By G. D. Jones and H. L. Dunton, p. 33. There were no significant differences between grain yields following application of all the N, P and K before sowing and separate application of all, or part of the N as a side dressing after maize emergence.
4. Maize and groundnut rotations. By E. T. Batten and others, p. 38-9. Studies are in progress on two and three year rotations with and without legumes and their effect on runner groundnut yields.
5. Maize on worn-out land. By H. L. Dunton and S. S. Obenshain, p. 39.
6. The southern maize rootworm [*Diabrotica* sp.] By W. D. Frank, pp. 57-8. Heavy losses in groundnut yields have been caused by *Diabrotica* larvae, particularly in wet seasons. Preliminary trials with dusts, sprays, or soil applications of BHC at rates of 1 lb. of the gamma isomer per acre, resulted in greatly increased groundnut yields on infested soil. The BHC also appeared to have a stimulating effect in itself on groundnut yields.
7. Manganese and groundnut yields. By G. M. Shear and E. T. Batten, pp. 65-6. On a sandy loam soil of pH 7.0 groundnut yields were 1600 lb. of unshelled seed per acre, following a side-dressing of 20 lb. manganese sulphate per acre in late June. Similar untreated plots yielded 480 lb. per acre. Under some conditions on soil of optimum pH for groundnuts, the use of manganese sulphate has raised yields 8 % over that of untreated crops.
8. Chemical seed treatment of groundnuts compatible with artificial inoculation with *Rhizobium leguminosarum*. By L. I. Miller, pp. 67-8. Spergon at 3 oz. per 100 lb. of seed had no effect on the type, number and location of root nodules. It is recommended that Spergon, and not Arasan should be used for treating groundnut seed that is to be artificially inoculated.—P.J.B.

932 **Virginia** Agricultural Experiment Station. Report for year ending June 30, 1950. Blacksburg, 1950, pp. 112.

INVESTIGATIONS REPORTED :

1. The use of P^{32} as a tracer. By W. W. Moschler and S. S. Obenshain, pp. 17-8.
2. Mulch tillage studies. By J. H. Lillard and others, p. 19.
3. Factors affecting the protein and oil content of inbred, hybrid and open-pollinated maize. By J. F Eheart and others, p. 23.
4. Rate of sowing experiments with maize hybrids of different maturities. By C. F. Genter and others, pp. 24-5. Results showed that the earlier the hybrid, the denser the optimum rate of sowing.
5. Development and selection of adapted maize hybrids. By C. F. Genter, p. 26. Work on experimental double-crosses is in progress.
6. Chemical weed control [in maize]. By G. M. Shear and others, pp. 26-7.
7. The effect of cover crops on maize yields, with and without applications of nitrogen, p. 28.
8. The time of applying nitrogen to maize on heavy soil. By G. D. Jones and H. L. Dunton, p. 28.
9. Maize yield improvement on poor land. By J. A. Lutz and others, pp. 28-9.
10. Disease studies on maize and small grains. By C. W. Roane, pp. 29-30. Notes on stalk rot and leaf blight of maize.
11. Small grain varietal trials. By E. Shulkcum and T. M. Starling, p. 31. Recommended varieties are given of winter and spring oats, barley and wheat for the Eastern, Piedmont and west of Blue Ridge regions of Virginia.
12. Rates and methods of seeding barley and oats. By P. T. Gish and others, pp. 31-2.
13. Small grain breeding. By T. M. Starling and C. W. Roane, pp. 32-4.
14. New rotation experiment. By R. K. Stivers, p. 34. A note on a new experiment involving the use of alfalfa, red clover, ladino and lespedeza in 3- and 4-year rotations of maize and small grains, with one, or two years pasture break.
15. Groundnut varietal tests. By L. I. Miller, pp. 62-4. Notes on selection for leaf spot (*Cercospora arachidicola*) resistance.
16. Investigations of the southern corn root worm (*Diabrotica undecimpunctate howardi*), attacking groundnuts By J. M. Grayson and others, p. 64. Notes on preliminary investigations with BHC for the control of this parasite are given.
17. Groundnut rotation experiments. By E. T. Batten and others, p. 65. Results for 5 years showed : 1. maize yields were only slightly lowered by inter-planting in soyabeans and the soyabeans yielded an average of 14 bu. per ac., 2. groundnut yields dropped rapidly when continuously grown, 3. Southern wilt (*Sclerotium rolfsii*) was prevalent in groundnuts grown after maize-soyabean crops grown together, and much worse in continuously grown groundnuts.
18. Groundnut breeding and testing, pp. 65-6.
19. Fertility, insect and disease control studies in groundnuts, p. 66.
20. Factors affecting quality and yield of Virginia Jumbo groundnuts. By G. M. Shear and L. I. Miller, pp. 66-7.
21. Comparison of seed disinfectants for groundnuts. By L. I. Miller, p. 67. Stands of groundnuts were significantly better than controls, following seed treatment with : Cuprocide, Arasan, Arasan SF, Phygon, W. Phygon, Panogen, Dow 9B, Barsprout, Seedox, W. Seedox, General Chemical 668, Spergon and Spergon DDT.
22. Leaf spot control in groundnuts. By L. I. Miller, pp. 67-8. Sulphur-copper mixtures were superior to sulphur, or to copper alone, in controlling leaf spot.
23. Groundnut drying. By V. H. Baker and others, pp. 69-70. See Abs. 751.
24. Soyabean varietal trials. By E. Shulkcum and others, p. 70. Varietal recommendations for the Eastern, Piedmont and west of Blue Ridge regions of Virginia are given.—P.J.B.

933 **Netherlands.** 14th NacCoBrouw Year-book, 1950. Rotterdam, 1950, pp. 120.

INVESTIGATIONS REPORTED :

1. Experiments with methods of drying barley in the field, 1949. By W. Wilten, pp. 30-4. See Abs. 676
2. Report of barley improvement in England and Eire. By H. de Haan, pp. 42-54.
3. Some aspects of insecticide research, with particular reference to the control of insects in stored grain, pp. 55-62. The use of DDT, HCCH (Gammexane) and tetra-ethyl pyrophosphate for the control of insect pests in stored barley is discussed, with particular reference to the hazards to human health attendant on their use.
4. The susceptibility of spring barley to loose smut. By A. J. P. Oort, pp. 63-6. In trials using artificially induced infection, Nova proved highly resistant, Haisa and Hylkema were slightly susceptible, Agio, Saxonia, Lenta and Balder were moderately susceptible and Herta, Mansholt's two-rowed, Heimdal, Carlsberg and Selecta proved highly susceptible to loose smut.
5. The influence of combine and binder harvesting, the previous crop grown and other factors on the quality of barley. By W. Wilten, pp. 75-87.
6. Field trials with malting barley, 1949. By W. Wilten, pp. 88-98. See Abs. 679.
7. Yields, statistics and characters of barley varieties. By W. Wilten, pp. 99-109. Notes on the variety Agio C.B. are given. In 1949, the variety Balder occuped 32 % of the acreage under barley in the Netherlands, an increase mainly at the expense of Saxonia. On sandy soils the acreage of Balder has diminished. Farmers are at present recommended to grow Kenia, Balder and Saxonia only.—P.J.B.

NEWS ITEMS AND NOTES

Great Britain

934 QUALITATIVE CONTROL OF SEEDS. A committee was appointed in 1949, " to consider what action was possible under the Seeds Act or under amendments to that Act, or otherwise, to introduce practical methods of qualitative control of seeds used in the United Kingdom, whether home-produced or imported". The work undertaken by the committee is outlined and an extensive summary of recommendations is given. The recommendations are grouped under the following heads to indicate the manner in which the proposals can be implemented : (a) new or amending regulations under the Seeds Act, 1920, (b) new statutory powers, and (c) recommendations which require advisory and similar work by the Agricultural Departments.—K.O.

Africa

935 NEW IDEAS IN AFRICAN AGRICULTURE. A fresh approach to the problem of mechanizing agriculture in Africa is outlined in a special survey prepared for the Colonial Advisory Council of Agriculture. The Report rejects the idea that mechanism as such would achieve desired, or desirable, results in increasing the agricultural resources of Africa. It is considered that in view of the pressure of population upon the natural resources of the land, the inefficiency of farm labour is not the principle cause of low production and that mechanization in many cases would merely increase production costs. The social changes produced by mechanization are of more consequence to the ultimate welfare of native populations than the increased efficiency so obtained. In some territories, the economic and cultural changes caused by mechanization have already resulted in social frustration and destructiveness, according to evidence supplied by the writers of the Report. For these reasons, those concerned in the framing and implementation of colonial development policies are urged to consider all the implications involved in pushing a pastoral society into an era of "agricultural commercialism", with all its attendant problems, both economic and social. The Report has not for its purpose the opposition of mechanization, but the demonstrations of the kind of problems involved in large-scale planning in Africa. The need for obtaining the co-operation and active participation of Africans in development schemes is strongly emphasized.—*The Observer*, Oct. 1950.—P.J.B.

South Africa

936 NEW INSECTICIDE. A preliminary note on the new insecticidal chemical amide, scabrin, is given in the *S. Afr. J. Sci.*, November, 1950. Scabrin was extracted recently from the roots of ***Hiliopsis*** (ox-eye) and has proved to be appreciably more toxic to houseflies than the standard insecticide pyrethrum. The effect of the chemical on other insects, animals, plants and soils has yet to be explored.—K.O.

Morocco

937 MAIZE IMPROVEMENT. Each year, about 500,000 ha. in Morocco are cultivated with *Zea mays*, 98 % by Moroccans and 2 % by Europeans. Yields are poor and oscillate between 4 and 8 q. per ha. Experiments for improving this crop were begun at the Centre de Recherches Agronomiques de Rabat in 1945, and comprise : (a) yield trials with maize from Moroccan and foreign sources ; (b) intervarietal hybridization ; (c) cultivation trials with American hybrids ; (d) creation of pure lines of maize of Moroccan and foreign origin and (e) hybridization between Moroccan and foreign stock. G. Grillot in *C. R. Acad. Agric. Fr.* Vol. 36, No. 5, 1950.—D.B.

Argentina

938 BLOOD PLASMA SUBSTITUTE. It is reported from Milwaukee that a group of investigators under Dr. John S. Hirschboek have manufactured a substitute for blood plasma from *Hibiscus esculentus*. It is claimed that this substance is as effective as real blood plasma, but has none of the disadvantages thereof. The cultivation of *H. esculentus* in Argentina has been shown to be a practical and economic proposition. *La Chacra*, April 1951.—N.G.S.

FIELD CROPS

CEREALS

WHEAT

939 SARASOLA, A. A., and FEHLEISEN, S. O. La sequía y los rendimientos de trigo en los partidos de Villarino y Patagones (Provincia de Buenos Aires, Argentina). [**Drought and wheat yields in the districts of Villarino and Patagones, Province of Buenos Aires, Argentina.**] *Lilloa* 1949, **18**, 179-89, bibl. 7, English summary p. 179. [Received 1951] [Div. Lab. Invest. Espec., Min. Agric., Argentina]

Wheat yields in the districts studied are determined by the rainfall in May to September and February to October, respectively. By the calculation of correlation indexes, wheat yields in Villarino may be forecast 3 months before harvest, with an average approximation of ± 92.9 kg. per ha., and those in Patagones 2 months before harvest, with an average approximation of ± 121.5 kg. per ha. A study of weather and yields in 24 successive years has shown that in many of these years heavy loss of wheat crops was caused by drought during the above-mentioned months.—G.M.R

940 ÅKERMAN, Å. Svalöfs Rival vårvete (01029 b). [**Svalöf's Rival spring wheat (01029 b).**] *Sverig. Utsadesfören. Tidskr.* 1951, **61**, 45-9, English summary.

Rival spring wheat, released to farmers in Sweden in 1951, is a reselection from Diamond II. In 60 trials it yielded an average of 4.2 % more grain than Diamond II and had a stiffer and shorter straw than that variety. It takes the same time to reach maturity as Diamond II and is of equally good baking quality. The yields of Rival have averaged somewhat less than those of Bronze and Kernel II (Kärn II).—From author's summary.

941 HOLMGREN, O. Kalmarfilialens utveckling och några aktuella arbetsuppgifter vid densamma. [**Progress at the Swedish Seed Association's branch at Kalmar and a report of some current investigations there.**] *Sverig. Utsädesfören. Tidskr.* 1951, **61**, 53-8.

In trials at 9 locations in south Sweden, Hansa winter wheat (a selection of Solvete × Standard) outyielded Standard and Solvete, but yielded slightly less than Eroica. Owing to its weak straw, Hansa is not recommended for the more fertile wheat soils of south Sweden. Work is in progress to improve the winterhardiness of Hansa. In rye trials, Petusker, King II and Steel have given approximately similar yields, but Petusker has done best on light, dry soils, while Steel and King II have done best on the more fertile soils. Agron rye has given yields inferior to the above three varieties, owing to its weak straw. Spring wheat so far has only been adapted to fertile, moist soils in south Sweden. In 20 of 22 years' trials, Fylgja has outyielded Diamond by an average of 7 %, though its baking quality is very poor. Over a 6-year period, an oat selection 01509, from a cross between a German variety Lochows Gelbhafer (yellow oat) and an unspecified Swedish variety, has outyielded Blenda, Golden Rain and Seger.—P.J.B.

942 ÅKERMAN, Å. Fortsatta undersökningar rörande raproteinhalt och bakningsförmåga hos Svalöfs Odinvete. [**Further experiments on the crude protein content and baking quality of Svalöf's Odin wheat.**] *Sverig. Utsäd-esfören. Tidskr.* 1951, **61**, 50-2, English summary p. 52.

In trials at 6 locations in Sweden, the crude protein content of Ergo winter wheat averaged 0.5 higher and Gluten not less than 1.5 % higher than that of Odin. Odin, a winter-hardy, high-yielding selection from the cross Ergo × Gluten has inherited the high gluten quality of Gluten. In spite of its lower protein content, Odin gave an average of 7 % greater bread volume than Ergo, though in this respect, it was still inferior to Gluten.—P.J.B.

943 HUTTUNEN, E. Kevätvehnä. [**Spring wheat. (in Finland).**] *Siemenjulkaisu* 1950, 29-38, English summary pp. 37-8. [Tammisto Plant Breed. Sta., Finland]

In the breeding of spring wheat, great attention has been paid at Tammisto to early ripening. Foreign varieties, of which Svalöf Diamond has been in very general use for the last two decades, tend to ripen too late in central and north Finland. The Tammisto-bred varieties Kimmo and Tammi, both several days earlier than Diamond, are at present generally grown. Tammi is the most popular variety of spring wheat in the northern cultivation areas. Among new varieties, the early strain a3278 is notable. Strain a3455 is also promising, and gives high yields. Diamond, most generally cultivated in the southern parts of the country, is beginning to lose its popularity because of its susceptibility to lodging. The use of Diamond II is spreading, and Kärn II also has proved so advantageous in field trials that its introduction in the south-west and southern parts of the country is considered desirable.—From author's summary.

944 LINJA-AHO, M. Syysvehnä. [**Winter wheat (in Finland).**] *Siemenjulkaisu* 1950, 24-9, English summary p. 29. [Tammisto Plant Breed. Sta., Finland]

The cultivation of winter wheat in Finland is restricted mainly to the clay soils of south-west and south Finland. The variety cultivated most is the Varma Winter Wheat of Tammisto. The target of breeding work is to produce a winter wheat superior to Varma in winterhardiness and at least equal to it in its other properties. Of the Swedish winter wheat varieties, the Virtus of Weibullsholm is best adapted to Finnish conditions. At the Hankkija Experimental Farm, Anttila, work has been in progress since 1946 to breed a winter wheat resistant to winter diseases.—Author's summary.

945 TRUHINOVA, A. T. [**Frost resistance of wheat in Siberia.**] [Russian] *Trudy Inst. Genetiki.* 1948, No. 16, 60-8, bibl. 7. [Received 1951]

Experiments indicated that the spring wheat variety Milturum 0321, after having been grown as winter wheat on stubble for three to four years in Siberia, has become as frost-resistant as the most hardy Siberian winter wheat varieties. The new form did not ear when sown in spring. Experiments with vernalized seed showed that, with spring sowing, ears are formed only when the seed has been treated at a temperature of 0-3°C. for a period of 34 to 36 days. The only slightly frost-resistant winter wheat varieties Ukrainka and Erythrospermum 1160 after having been grown for four to five generations in the Urals have appreciably increased their frost resistance.—R.P.J.

946 AHLAWAT, M. R. **Punjab.** *Indian Fmg* 1950, **11**, 304. [Govt Agric. Coll., Ludhiana]

The new beardless wheat variety, C-224, outyielded local varieties by 120-820 lb. per acre in trials held in the Kulu valley, Kangra district, at a height of 4000 to 6000 ft. a.s.l. in 1946-7 and 1948-9.—N.G.S.

947 ROSSER, D. **Lawrence—a new wheat variety.** *Qd agric. J.* 1951, **72**, 17-18.

This slow-maturing, hybrid wheat selection of the cross Florence × College 3813 has been registered as Lawrence. It tillers freely and produces a good bulk of frost- and rust-resistant foliage which is useful for grazing, and later, produces medium-sized grain. The straw is hollow, moderately tall, but fairly resistant to lodging. It is less drought-resistant than some of the quicker maturing Queensland varieties, but yields well under good conditions.—K.L.

948 GUARINO, T. Ensayos chacareros de variedades de trigo realizados en la zona de los servicios agronómicos de Dolores. [**Field trials with wheat varieties in the Dolores (Uruguay) zone of the agricultural service.**] *Bol. Informativo, Uruguay* 1951, **8**, No. 372, 4. [Servicos Agronómicos de Dolores, Uruguay]

Field trials were carried out with 16 wheat varieties on two farms, one in Colonia Concordia and the other in Cañada Magallanes. The highest yielding variety was Litoral Precoz in both cases, followed by Klein Cometa and Sinvalocho in Colonia Concordia, and Petiblanco in Cañada Magallanes. The crop at Colonia Concorda was attacked by *Puccinia graminis* and *P. triticina*; the most resistant varieties to these diseases were 3352 WO(W), DQ 3 (150) 2Q, Sinvalocho, Litoral Precoz and Klein Cometa. Of the new varieties tried, 3352 WO(W), Sinvalocho, and DQ 2(150)2Q showed most promise. Klein Anniversario and Klein Condor were of irregular performance.—N.G.S.

949 OKLAHOMA Agricultural Experiment Station Bull. No. B-366. **Oklahoma state-wide variety tests of wheat, oats and barley; 1947-1950.** By *R. M. Oswalt* and *A. M. Schlehuber.* 1951, pp. 25.

The varieties listed as currently recommended for Oklahoma are as follows. Hard wheats: Cheyenne, Comanche, Pawnee, Tenmarq, Triumph, Westar and Wichita. Soft wheat: Clarkan. Autumn-sown oats: Forkedeer, Stanton Str. 1, Tennex, Traveler, Wintok and DeSoto. Winter barleys: Harbine, Tenkow and Ward.—P.J.B.

950 AUFHAMMER, G. Ergebnisse der Kleberweizen-Untersuchungen aus den Ernten 1948 und 1949. [**Testing wheats from the 1948 and 1949 harvests for gluten quality.**] *Z. PflBau PflSchutz* 1950, **1** (45), 267-80. [Tech. Hochsch., Weihenstephan, Munich]

From 1935 onwards continuous efforts to improve the baking quality of home-grown wheats in Germany have met with success. The Bavarian Seed Breeding Station at Weihenstephan, has tested such wheats in Bavaria for 15 years. The number of suitable bred varieties of winter wheat available has risen from one in 1935 to approximately ten in 1949. The results of 1948-9 tests are tabulated. In spite of different climatic, soil and cultural conditions, good (Grade A) or moderately good (Grade B) baking quality was found to be a constant varietal character and correlated to inherited characters, structure of the gluten in particular. On the other hand, the amount of gluten formed in the grain is subject to much variation depending on the weather at different seasons. For example, the average gluten content in 1945 and 1949 (abnormally dry, warm spring and summer resulting in heavy yields of full grain with high starch content) was 20 % only, whereas in 1938, 1944 and 1947, when weather conditions were normal, it was 25 %. It is estimated that of the wheat grown in

Bavaria, at least 20 to 25 % comprise varieties of good baking quality.—G.M.R.

951 Bolli, M. Azione delle soluzioni saline sulla germinazione delle cariossidi di frumento. [**Action of salt solutions on the germination of wheat caryopsides.**] *Ann. Fac. Agr. Univ. Perugia* 1943, **2**, 77-83, bibl. 7. [Received 1951]

952 Lansade, —, and others. Essais et controle de produits contre la carie du blé. [**Trials with, and control of products used in combating smut in wheat.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 73-5. [Stat. centrale de pathologie végétale de Versailles]

A brief account is given of chemical fungicides for control of *Tilletia tritici* on wheat. The most effective were pentachlornitrobenzene and 8-hydroxyquinoleate of copper. The official control of the quality of commercial products protects the public from those which are so weak to as be inefficacious and those which are too extravagant.—D.B.

953 Johnston, C. O., and others. **Reaction of hard red winter wheats to bunt in uniform bunt nurseries (1943-1947).** *Agron. J.* 1951, **43**, 61-6, bibl. 5.

954 Beliz, J. M. Sistemática de trigos. II. Classificação e desçricão botânica de algumas formas cultivadas Portuguesas. [**Wheat systematics. II. Classification and botanical description of some cultivated Portuguese forms.**] *Agron. Lusitana* 1949, **11**, 141-60, pl. 16, bibl. 3, illus., English translation pp. 152-60. [Received 1951] [Esta. Melhoramento de Plantas, Elvas, Portugal]

The varieties described are: *Triticum vulgare*—Gentil, Da Piedade, Centeio, Elvense, Magueija de Colmo Cheio, Ribatejano, Sado, Transmontano, Pirana, Barbado, Beirão, Luso 2740, Luso 3478, and De S. Vicente; *T. turgidum*—Arouca; *T. durum*—Guadiana. Each varietiey is illustrated by excellent photographs showing the ear and grain. [See *Fld Crop Abstr.* 3 : 650]—N.G.S.

955 Beliz, J. M. Sistemática de trigos. III. Classificação e desçricão botânica de algumas formas cultivadas em Portugal. [**Wheat systematics. III. Classification and botanical description of some cultivated forms in Portugal.**] *Melhoramento* 1950, **3**, 76-92, pl. 8, bibl. 7, English translation pp. 85-91. [Lab. Botânica, Esta. Melhoramento de Plantas, Elvas, Portugal]

The varieties described are: *Triticum vulgare*—Roma, Quaderna, Bejense, Bárbaro, Galego Miudo, and Oberdan; *T. durum*—Hedba, Cappelli, and Preto de Tavira. An excellent photograph is given of an ear and three grains of each variety.—N.G.S.

956 Sanchez-Monge, E., and Villena, L. M. Variedades de barba lisa entre los trigos espanoles. [**Some smooth-awned varieties among Spanish wheats.**] *Anal. Esta. Exptl Aula Dei* 1951, **2**, 210, bibl. 2, English summary.

The *Triticum durum* varieties Alonso, Amoros, Caravaca 1, Caravaca 7, Valenciano, Ruso and Santa Coloma are botanically classified. The awns of Alonso, Caravaca 1, and Santa Coloma, are apparently hairless, but have a small number of microscopic hairs; the other varieties have entirely hairless awns.—N.G.S.

957 Grimaldi, A. Sulla presenza di spighette soprannumerarie nel frumento. [**The presence of supernumerary spikelets in wheat.**] *Ann. Fac. Agr. Univ. Perugia* 1942, **1**, 101-10, bibl. 2. [Received 1951]

958 Pereira, A. Sobre o fósforo no grão de trigo. [**The phosphorus content of the wheat grain.**] *Agron. lusit.* 1948, **10**, 245-61, bibl. 33, English summary p. 259. [Esta. Agron. Nac., Sacavem, Portugal]

Three colorimetric methods of analysing the total phosphorus content of wheat grain were compared, preference being given to the Denigès method, modified according to Lindner (*Plant Physiol.* 1944, 19, 76-89). Four varieties of *Triticum vulgare* and one of *T. turgidum* grown at Sacavem at different seeding rates were studied for phosphorus by this method and by a previously described method [*Fld Crop Abstr.* 2 : 1288] for nitrogen. The phosphorus content ranged from 0.38 % to 0.52 %, and a highly significant positive correlation (r = 0.76) between the values for phosphorus and nitrogen was established.—G.M.R.

959 Couperot, —, Variation de la composition des cendres du blé avec la teneur en cendres. [**Variation in composition of the ash of wheat with the percentage of ash.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 641-2.

960 Volkov, I. A. [**The root system of spring wheat under irrigated conditions in the central black soil zone of the RSFSR.**] Russian] *Doklady Akad. Nauk SSSR.* 1951, **57**, 129-32, bibl. 1. [Timirjazev Inst. Plant Phys.]

Results of an investigation conducted in 1949 are reported. Irrigation had a favourable effect on the growth and development of the root system of spring wheat. The main bulk of the roots was found in the 0-40 cm. layer. The distribution of the roots according to depth in this layer was unequal, the greater part occurring in the ploughed horizon.—R.P.J.

961 Sempio, C. Respirazione, glicolisi, traspirazione e attività enzimatiche in piante di frumento esposte alla luce continua. [**Respiration, glycolysis, transpiration and activity of the enzymes in wheat plants exposed to continuous light.**] *Ann. Fac. Agr. Univ. Perugia* 1942, **1**, 113-15, bibl. 3. [Received 1951]

962 Bolli, M. Metabolismo gassoso e plastico negli ultimi stadi di sviluppo di un grano tardivo e di uno medio precoce. Nota preventiva. [**Gaseous and plastic metabolism in the last stages of development of a late wheat and a medium early wheat. Preliminary note.**] *Ann. Fac. Agr. Univ. Perugia* 1943, **2**, 87-9. [Received 1951]

963 Coïc, Y. Fertilisation azotée rationnelle du blé. [**Nitrogen fertilization of wheat.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 296-9.

A short general account is given of the nitrogen requirements of the plant and their application to agriculture. The conclusion is that, for intensive cultivation, nitrogen manuring is an individual matter depending on the variety of wheat, its environment and the weather existing in any particular year.—D.B.

964 Coïc, Y., and others. Influence de l'époque d'apport des engrais azotées sur les composantes du rendement du blé. [**Effect of the time of applying nitrogen manure on the yield components of wheat.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 231-4.

The three components of yield are number of ears per hectare, average number of grains per ear, and average weight of grain. The wheat varieties under field experiment were Vilmorin 27 and Franc-Nord. Grain yields were recorded for four systems of nitrogen manuring: (1) no nitrogen; (2) 40 kg./ha. in March; (3) 40 kg./ha. in March and 20 kg./ha. in early May; and (4) 40 kg./ha. in March and 20 kg./ha. in late May. In each case grain yield was highest when additional nitrogen fertilizer was applied early in May. [Form of N not stated]. The yield component which governed the increase was number of grains per ear. This was probably a result of greater assimilation, which in turn led to a decrease in the number of aborted grains. When the additional 20 kg./ha. was applied at end of May, grain yields per hectare were less than when applied early in May, but average weight of grain was higher, and with this the baking quality was better and market value increased.—D.B.

BUCKWHEAT

965 Geroev, M. Ja. [**A new variety of buckwheat (*Fagopyrum esculentum*)—Gornolesnaja.**] [Russian] *Selek. Semenovod.* 1951, **18**, 79-80.

The variety Gornolesnaja was selected from local buckwheat in the Dyvan state varietal trials of the Vaškir ASSR. It ripens early; the period from complete germination to full flowering being 30 to 40 days, and from full flowering to wax ripeness, 38 to 40 days. In dry years the period from complete germination to wax ripeness is reduced to 53 days. The variety is resistant to lodging. The height of the plants varies from 73 to 100 cm. Gornolesnaja is more resistant to spring and summer frosts than any of the other varieties investigated. Its hull percentage is 22, or 4.5 % less than in other varieties. In 1950 it gave a yield of 8.8 centners (centner = 100 kg.) per ha. which is 2 to 4 centners higher than that of the other varieties tested.—R.P.J.

966 Dimov, R. I. [**The effect of steeping seeds of buckwheat (*Fagopyrum esculentum*) in warm water on germination and yielding capacity.**] [Russian] *Selek. Semenovod.* 1951, **18**, 78-9, bibl. 1. [Tulun Plant Breed. Sta.]

Steeping the seeds of buckwheat in water [duration not stated] at a temperature of 40°C. increased their germination, energy of germination and yielding capacity. Seeds steeped for 10 minutes in water at 40°C. gave the highest yield, which exceeded that from dry seeds by 2.2 centners per ha. Steeping the seeds in water at a temperature of 65°C. for five minutes caused a sharp reduction in germination, energy of germination and yielding capacity. —R.P.J.

OAT

967 Northern Ireland, Monthly Report of Ministry of Agriculture. **Report on oat variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1951, **25**, 266-70.

A brief account is given of the results of trials carried out, mostly in 1949, in various districts of Northern Ireland, under the supervision of the Agricultural Advisory Officers and at the Greenmount and Loughry Agricultural Colleges, to test several new oat varieties. Of the varieties suitable for fertile soils, Sun II (Steel) from Sweden gave the highest average grain yield, followed by Glasnevin Triumph of the Glasnevin Plant Breeding Station, Dublin, and by S.84 of the Welsh Plant Breeding Station, Aberystwyth. Glasnevin Triumph showed a tendency to lodge on very fertile soils. Varieties suitable for soils of low fertility, particularly at high altitude, were also tested.—E.B.

968 Huttunen, E. Kaura. [**Oats.**] *Siemenjulkaisu* 1950, 47-57, English summary p. 57. [Finland]

The most outstanding result achieved in plant selection work in Finland is the Eho Oat released on the market in 1946. This oat thrives well in the central parts of Finland. In many respects it resembles Sisu Oat, released about 2 years ago. In field trials, the latter has proved the highest-yielding of all the North Finnish oat varieties—From author's summary.

969 NICHOLSON, G. **Oat and barley varieties recommended for 1951 sowings.** *Agric. Gaz. N.S.W.* 1951, **62**, 97-100.

Short descriptive notes are given of 18 varieties of oats and five varieties of barley. Information is given on their adaptability to various districts of New South Wales, their use as green fodder, hay, silage or grain and their malting and maturing qualities.—K.L.

970 RIBEIRO, R. Inclusión de la "*Avena strigosa*" Schreb. ssp. "*strigosa*" (Schreb.) Thellung entre las avenas de gran cultivo en el Uruguay. [**Inclusion of *Avena strigosa* Schreb. ssp. *strigosa* (Schreb.) Thell. among the oats widely cultivated in Uruguay.**] *Lilloa* 1949, **18**, 165-78, bibl. 19, English summary pp. 165-6, [Received 1951] [Fac. Agron. Univ. Montevideo, Uruguay]

Strigosa 3381, a new oat variety of which 50 to 70 tons of seed were to be distributed in 1950 by La Estanzuela Plant Breeding Station, Uruguay, is described. It is identified as *Avena strigosa* Schreb. ssp. *strigosa* (Schreb.) Thell. var. *glabrescens* (Marquand) Thell, and possibly subvar. *uniflora* (Parl.) Maltzev. Four years' trials at La Estanzuela, in comparison with *Avena sativa*, *A. byzantina*, and with a hybrid of these two spp., showed Strigosa, when used as a grazed or as a soilage crop, to be superior to the other varieties in yield of green matter, to provide a finer quality herbage, and to recover after grazing better than *A. sativa*, or the hybrid, although not quite so well as *A. byzantina*. As a grain crop, the straw yield of Strigosa is higher than that of the other varieties, but its grain yield is lower, except when these others are attacked by *Puccinia coronata*, to which Strigosa is immune. This immunity to rust renders its grain yield very reliable. The grain is readily separated from the chaff, of which there is a low proportion. Its low thousand-grain weight effects a saving of approximately one-third in sowing.—G.M.R.

971 DERICK, R. A. **A new variety of oats for eastern Ontario.** *Sci. Agric.* 1951, **31**, 176. [Cereal Div., Cent. Exptl Fm, Ottawa]

Lanark, a variety originating from the cross Onward × (Anthony x Bond), made in New Zealand, is being made available to growers in eastern Ontario. The variety has a limited adaptation to those areas in eastern Ontario where rust is prevalent and where a variety with early maturity and strong straw is of special importance. It is well adapted for use in mixtures with barley, or as a nurse crop.—P.J.B.

972 ILLINOIS Agricultural Experiment Station. Circ. 679. **Spring oats for Illinois. Variety trials 1946-1950. Disease hazards 1950.** By *J. W. Pendleton* and others. 1951, pp. 8.

On the basis of performance during the last 3 years, the following varieties are recommended for northern Illinois: Clinton, Marion, Bonda, Andrew, and Nemaha. For central Illinois: Clinton, Andrew, Mindo, Bonda and Marion. For southern Illinois: Benton, Marion, Columbia and Andrew. In 1950, Race 45 of crown rust caused losses estimated at 10 % of the harvest in Illinois. In trials to determine the reaction of a number of oat varieties and experimental hybrids to crown rust Race 45, varieties classified as resistant, were Branch and Missouri 0-205; varieties classified as of intermediate resistance to resistant were Garry and Tama.—P.J.B.

973 THURSTON, Joan M. **A comparison of the growths of wild and of cultivated oats in manganese-deficient soils.** *Ann. appl. Biol.* 1951, **38**, 289-302, bibl. 8, pl. 1. [Rothamsted Expt Sta., Harpenden, Herts.]

Two species of wild oats, *Avena fatua* and *A. ludoviciana*, and two varieties of cultivated oats, for comparison, were grown to maturity in pots of manganese-deficient soil with and without added manganese. *A. ludoviciana* showed different leaf symptoms of manganese deficiency from *A. fatua* and the cultivated varieties. In other respects wild and cultivated oats were similar in their responses to the level of manganese supply, though differences were observed in the severity of the effects. The relative susceptibility to manganese deficiency of the wild and cultivated oats differed according to the effect considered. The total dry weight at harvest is an integration of all the preceding effects on growth and is therefore presumably the best single criterion for determining susceptibility to mangan-ganese deficiency. On the basis of per cent loss of total dry weight at harvest due to lack of manganese, *A. fatua* is judged less susceptible and *A. ludoviciana* more susceptible than the two cultivated varieties and no distinction can be made between the latter. The most interesting differences between wild and cultivated oats in response to the level of manganese supply occurred in seed production. Manganese-deficient wild oats showed a smaller reduction in the number of seeds formed, but a greater reduction in the size and manganese content of individual seeds, than the cultivated varieties. Manganese deficiency lowered the percentage of viable seeds and the percentage of dormant seeds produced by both *A. fatua* and *A. ludoviciana*.—Author's abstract.

RYE

974 LINJA-AHO, M. Syysruis. [**Winter rye (in Finland).**] *Siemenjulkaisu* 1950, 18-24, English summary p. 24.

Winter rye has lost its position to spring wheat as the most cultivated bread cereal in Finland. The winterhardiness of domestic rye varieties is adequate for Finnish conditions. Of foreign rye varieties, only Sangaste has proved suitable for cultivation under conditions prevailing at Tammisto. The Finnish winter rye varietes have too weak a straw, the improvement of which has been the goal of breeding work.—From author's summary.

975 ŽUKOVSKIǏ, A. V., and SELIVANOVA, S. N. [**The biology of the stem moth (*Ochsenheimeria* sp.)—a pest of winter cereal crops and forage grasses.**] [Russian] *Doklady Vsesojuz. Akad. S-H. Nauk* 1951, **16**, 32-4, bibl. 4. [Voronež Plant Protect. Sta.]

In 1950, in the Voronež Province, rye was heavily attacked by the stem moth (*Ochsenheimeria* sp.). Winter wheat was more lightly attacked, and isolated larvae were found in the stems of spring wheat. The life cycle of the pest is described. The larvae are very active, one individual being able to destroy several stems. Preliminary tests in dusting rye with hexachlorane resulted in 85 % of the caterpillars on the stems being destroyed.—R.P.J.

976 SCHMALFUSS, K. Siebzig Jahre "ewiger Roggenbau." **Seventy years' continuous rye cultivation.** *Khün-Arch.* 1950, **63**, 1-14, bibl. 8. [Univ. Halle Saale, Germany]

This supplementary account of the classic rye manurial trials, started by Kühn in 1879, brings the information up-to-date by means of tables and graphs. The rye continues to do well without being attacked by any special pests or diseases.—G.M.R.

BARLEY.

977 FRANCE. Société d'encouragement de la culture des Orges de Brasserie et des Houblons en France. [Society for Promoting the Cultivation of Brewing Barley and Hops in France.] **Report for the Season 1948.** Paris, 1948, pp. 65. [Received 1950]

INVESTIGATIONS REPORTED :

1. Climate of the season 1947-8, pp. 3-7.
2. Tabulated and diagrammatic information on the performance of varieties of barley in trials in various parts of France, pp. 8-65.—D.B.

978 BRUMMER, V. Ohra. [**Barley.**] *Siemenjulkaisu* 1950, 38-47, English summary pp. 46-7.

The early-ripening 6-row Tammisto variety (Tammi) is the most popular early barley in Finland. Of 2-row barleys, Balder has given good results in the tests. It has been selected to replace the old variety Binder, but its straw is so short that harvesting is hampered. Experiments with the varieties Rigel and Herta should be continued.—From author's summary.

979 OKLAHOMA Agricultural Experiment Station. Bull. No. B 367. **Harbine. A new combine barley.** By *T. H. Johnston* and *A. M. Schlehuber.* 1951, pp. 14.

The origin and characteristics of Harbine are described. It is a six-rowed, rough-awned, small-seeded variety, with a short, erect head. Under Oklahoma conditions, it is a medium-early, high-yielding variety. Its outstanding characteristics are its resistance to lodging, suitability for combining and its high test-weight. During the period 1941-50, the average yields of Harbine, Ward, Tenkow and Michigan Winter, grown at Stillwater, were 33.9, 34.1, 33.4 and 31.5 bu. per ac., respectively. See also *Fld Crop Abstr.* 4 : 1271.—P.J.B.

980 SCHALLER, C. W. **The effect of mildew and scald infection on yield and quantity of barley.** *Agron. J.* 1951, **43**, 183-8, bibl. 16. [Agron. Div., Calif. Univ., Davis]

Powdery mildew (*Erysiphe graminis hordei*) and Rhynchosporium scald (*Rhynchosporium secalis*) rank with barley stripe as being the most destructive barley diseases in California. Determinations were made of the yield, kernel-number per spike and kernel-weight of Atlas and the mildew- and scald-resistant variety Atlas 46 grown at several locations during 1947-9. No attempt was made to initiate, or control, mildew or scald incidence at any locality. Mildew was widespread during the early stages of growth during all 3 years, though only in 1948 did infection continue long enough to infect the flag leaf. Scald was sufficiently prevalent in 1948, only, to warrant a study of its effect on yield. On paired plots at disease-free locations, the performances of Atlas and Atlas 46 were essentially identical. Following heavy mildew infection throughout the growing season, Atlas 46 yielded an average of 6.8 bu. per ac. more than Atlas, attributable directly to the mildew infection on Atlas. Under lightly-mildewed conditions Atlas 46 yielded an average of 2.5 bu. per ac. more than Atlas. Mildew infection had a significant effect on the number of kernels per spike in Atlas in all 3 years, but in only one year (1948), was kernel-weight affected. The reduction in kernel numbers per spike was due to a reduction in the number of fertile nodes, rather than to an increase in the number of sterile spikelets. In 1949, kernel-weights in Atlas were significantly heavier than in Atlas 46, a result of the recovery of Atlas from an early mildew infection and the consequent reduction in number of kernels per spike. In 1948 the kernel weight of Atlas 46 was significantly greater than that of Atlas, which was heavily infected with mildew. The prevalence in scald infection in 1948 resulted in an average yield increase of 6.7 bu. per ac. for Atlas 46, as compared to Atlas.—P.J.B.

981 McBean, D. S., and Platt, A. W. **Differential damage to barley varieties by grasshoppers.** *Sci. Agric.* 1951, **31**, 162-75, bibl. 29. [Exptl Farms Service, Canada Dept Agric.]

In trials at 10 locations in Alberta and Saskatchewan during 1944-7, between 36 and 42 varieties of barley were exposed to naturally-occurring grasshopper populations. In 9 of 12 trials, there were significant differences between varieties in the extent of grasshopper damage suffered by them. In 8 out of these 9 trials, the damage consisted of head dropping; appreciable feeding by grasshoppers did not occur until the crop had headed. In the remaining trial, feeding began at an early stage of growth and continued until the crop was mature; susceptible varieties were eaten to the ground, while resistant varieties grew normally to maturity and suffered no damage, except some leaf stripping. Among the commercial varieties tested, O.A.C. 21, Regal, Rex and Newal were susceptible; Plush, Titan and Trebi were moderately susceptible and Glacier was moderately resistant. In 8 of 9 tests, significant positive correlations were found between grasshopper damage and the date of heading of varieties; early-maturing varieties tended to be resistant, while late varieties were susceptible. In 7 of 9 tests, the protein content of the plants was positively correlated with grasshopper damage; grasshoppers tended to feed almost exclusively on high-protein material.—P.J.B.

982 Cormack, D. V., and others. **Fertilizer studies with radio-active sulphur. 1.** *Sci. Agric.* 1951, **31**, 41-51, bibl. 20. [Alberta Univ., Edmonton]

Applications of Na_2SO_4 containing radioactive S^{35} as a tracer were made to Olli barley grown on S-deficient soil at Breton Field, Alberta. About 50 % of the S in the barley plants was derived from the Na_2SO_4 applications, but there was no significant increase in barley growth, as compared to controls.—From author's summary.

MAIZE

983 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 14. Cultivo y almacenaje del maíz en El Salvador. [**Cultivation and processing of maize in El Salvador.**] By *J. M. Watkins* and *J. M. Argueta.* 1950, pp. 5.

Maize should be sown following a leguminous green manure crop. The seed should be treated with Semesan Jr. or Phygon-XL-DDT before sowing at rates of 6 spoonsful and 12 spoonsful per quintal respectively. N should be applied at a rate of 180 lb. nitrate of soda or ammonium sulphate at the time of sowing. The optimum sowing date lies between May 5th-17th. Recommended dates for a succeeding maize crop are Sept. 10th-15th for the tunalmil, and Jan. 1st-Feb. 1st for irrigated crops. Optimum spacing is 80 to 100 cm. by 40 cm., with 3-4 plants per hill. Spacing should be wider in poor soils. Recommended varieties are Venezuela No. 3 (white), Cuban PD(MS) (yellow) and Hawaiian No. 1. The hybrid Venezuela No. 3 Empalizada gives greater yields than the others, but pure first cross seed must be maintained. Beans should be sown between the rows when the maize ripens in order to prevent erosion. Recommended legumes are: *Dolichos lablab*, *Stizolobium deeringianum*, *Canavalia ensiformis*, *Cajanus cajan*, *Vigna unguiculata* and *Glycine max*.—N.G.S.

984 Abalo, R. A. Influencia de la epoca de siembra sobre el rendimiento de las variedades de maiz en Pergamino. [**Influence of sowing date on yields of maize varieties in Pergamino (Argentina).**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 147-51. [Esta. Exptl Pergamino, Argentina]

The trials were carried out in the period 1940-7, excluding 1942 and 1945 when a drought and locusts, respectively, invalidated results. The varieties used were Col. Klein (which gave the highest yields), Col. Manfredi, Col. Casilda (39) 65, Col. Cuarentón Klein, Amarillo Klein and Amarillo Canario Klein. Sowing was at fortnightly intervals from 25th Aug.-10th Nov. Highest yields were obtained from the second sowing (10th Sept.). The lower average yields from the first sowing are attributed to frost damage.—N.G.S.

985 Abalo, R. A. Influencia de densidades de siembra sobre el rendimiento de variedades de maiz en Pergamino. [**Influence of sowing density on the yield of varieties of maize in Pergamino (Argentina).**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 139-45. [Esta. Exptl Pergamino, Argentina]

The varieties used were Col. Klein, Col. Manfredi, Col. Cuarentón Klein, Amarillo Klein and Amarillo Canario Klein, of which Col. Klein gave the highest yields. The spacings tested were 70 × 30, 70 × 25 and 70 × 20 [presumably cm., but not stated]. The best results were obtained from the 70 × 30 spacing in which fewer infertile plants were produced, and the average cob weight was heaviest. At 70 × 20, some of the plants did not form heads. Col. Cuarentón Klein and Amarillo Klein had the largest number of infertile heads. It is suggested that yields equal to those from 70 × 30 spacing could be obtained from even sparser densities.—N.G.S.

986 Alaggia, H. A., and Lucas Paz, R. Distancias de siembra de maices dent. [**Sowing distances for dent maize.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 131-7, bibl. 4. [Div. Invest. Agron. ANCAP, Argentina]

The variety used was Midland. Distance between rows was 1 m., and between plants 0.10, 0.20, 0.35, 0.50, 1.00 and 1.20 m. Highest yields were obtained at 1.00 and 1.20 m. between plants, the difference of the yields at these spacings from the yields at the lower spacings being highly significant.—N.G.S.

987 Celidonio, C. I mais ibridi in Piemonte. [**Hybrid maize in Piedmont, Italy.**] *G. Agric. Domen.* 1951, **61**, 158.

Advice is given on growing hybrid maize in Piedmont. Sowing should be between 20th April and 15th May. The American varieties and the first Italian varieties of hybrid maize which have performed best in this region in 1949-50 are indicated. —E.B.

988 Brètignières, L., and others. La culture du maïs en France. [**Cultivation of maize in France.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 318-39.

Reports are given on growth and yields of American hybrids and French varieties of *Zea mays* in 1949 (a very dry year) in parts of France, including the southern region (district near Montpelier and the foothills of the Pyrenees), Limagne, Bresse in the Vosges, and the neighbourhood of Paris.—D.B.

989 Angulo-Busquets, M. Ensayos con hibridos americanos de maiz en 1950. [**Experiments with American maize hybrids in 1950.**] *Anal. Esta. Exptl Aula Dei* 1951, **2**, 204-9, bibl. 3, English summary p. 209.

Further trials with American hybrid maize at Zaragoza showed that most varieties were superior in yield to the local varieties, although less resistant to the European corn borer. See also *Fld Crop Abstr.* 3 : 1302.—N.G.S.

990 Costa-Rodrigues, L. **Tests on hybrid maize.** *Agron. lusit.* 1949, **11**, 223-40, bibl. 4. [Esta. Agron. Nac., Sacavem, Portugal]

Thirty maize hybrids and 79 inbred lines from the USA were sent by FAO in 1948 to be tested in Portugal. The trials were conducted in different parts of that country and arranged in a simple lattice design with four replications, in conformity with similar trials in other parts of Europe. Information is given on the soils concerned and on cultural technique. The results obtained in 1948 and 1949 are summarized in 12 tables, and some conclusions are drawn. Exceptionally good behaviour was exhibited by the hybrid Wis. 641 AA.—G.M.R.

991 Boerger, A. La siembra de maiz hibrido en el Uruguay. [**The sowing of hybrid maize in Uruguay.**] [Reprint from] *Bol. Informativo Uruguay* 1951, **8**, No. 366. [La Estanzuela, Colonia, Uruguay]

The position regarding hybrid maize in Uruguay is discussed. The variety Síntesis La Estanzuela No. 2, evolved from Colorado La Estanzuela and Colorado Klein, has yielded over 200 kg. grain per ha. more than commercial varieties. Experiments are in progress with the variety Midland, which is reported to be a free pollinating maize suitable for seed production.—N.G.S.

992 Gheorghianov, V. Ensayo comparativo de maices Argentinos y Uruguayos. [**Comparative trials of Argentinian and Uruguayan maizes.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 113-29. [Inst. Fitotécnico, La Estanzuela, Uruguay]

The four best commercial varieties were Colorado La Estanzuela, Colorado Klein, Hibrido No. 1 La Estanzuela and Síntesis No. 1 La Estanzuela. The hybrid Santa Fe No. 3 gave, on average, 20 % more grain than these. Maizes of high forage production, such as Diente Blanco, and Colorado Forrajero, gave the lowest grain yields.—N.G.S.

993 Grieben, H. L. G. Resultados de los ensayos comparativos con variedades e hibridos comerciales de maiz. [**Results of comparative trials of commercial maize varieties and hybrids (in Argentina).**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 91-111, [Minist. Agric. Ganad., Argentina]

The results of maize variety trials carried out on different Argentinian experimental stations during the period 1946-9 are tabulated.—N.G.S.

994 Abalo, R. A. Comportamiento de hibridos tipo dentado y duro de origen norteamericano y del pais, en Pergamino. [**Behaviour of North-American and Argentinian dent and flint maize hybrids in Pergamino.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 85-9. [Esta. Exptl Pergamino, Argentina]

The most widespread varieties of maize in Argentina are the flint type, with red and yellow grains. Dent maize is grown only for local use. Of 33 varieties tried at Pergamino, the best of those on the Official Register was Col. Klein, a flint maize. The best of the varieties tried were Santa Fe No. 3, a flint maize, and US. 13, a dent maize.—N.G.S

995 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 31. Maíz Hibrido. [**Hybrid maize.**] By *R. Domínguez V.* 1951, pp. 5.

996 Seed World. **New outstanding Texas corn [maize] hybrids.** *Seed World* 1951, **68**, 20-2. [Texas Agric. Expt Sta., College Station]
Texas 26 and 28 were released to farmers in 1949 ; Texas 30 was released in 1951. In trials during 1948-50 at 11 locations, Texas 26 and 28 outyielded all other hybrids tested. Texas 26 has medium-sized ears with yellow dent-type grain and matures in approximately 118 days. Texas 28 produces somewhat larger ears than Texas 26, with better husk cover and matures in 120 to 125 days. Texas 30 has produced slightly higher yields than Texas 26 and 28 over the last 2 years and was also superior to them in resistance to disease and pests. Texas 30 is particularly resistant to root lodging and in maturity is intermediate between Texas 26 and 28.—P.J.B.

997 Neal, N. P. **Wisconsin releases two new hybrid corns.** *Seed World* 1951, **68**, 78-9. [Wisconsin Agric. Expt Sta., Madison]
A brief note is given of two new hybrid maize varieties, W-464 and W-464A, both of which are of 100 relative maturity and have high resistance to stalk-rotting diseases.—P.J.B.

998 Bryan, W. W. **Queensland certified hybrid maize. Pt. 1. The story in general. Pt. 2. Notes for growers on procedure of seed production.** *Qd agric. J.* 1950, **71**, 187-96, and 249-54.
Coleman, F. B. **Pt. 3. Summary of rules.** *Qd agric. J.* 1950, **71**, 311-5.

999 Savoia, H. J., and Abalo, R. A. Comportamiento de variedades comerciales, hibridos y material de crianza, a la podredumbre del pie del maiz. [**Behaviour of commercial varieties, hybrids and breeding material to maize foot-rot.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 29-33, bibl. 2. [Esta. Exptl Pergamino, Argentina]
Trials to determine the resistance of various maizes and maize hybrids to foot-rot (*Sclerotium bataticola*) were carried out. Of the commercial varieties, Colorado Manfredi and Colorado G. 39(65)M.A. were the most resistant.—N.G.S.

1000 Savoia, H. J., and others. Podredumbre del pie del maiz. [**Foot-rot of maize.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 21-7. bibl. 3. [Esta. Exptl Pergamino, Argentina]
The cause of foot-rot of maize, also known as 'charcoal rot', in Pergamino is identified as *Sclerotium bataticola*.—N.G.S.

1001 Hemlienko, F. E. [**Investigation of bacteriosis of maize cobs.**] [Russian] *Doklady Vsesojuz. Akad. S-H. Nauk* 1951, **16**, 35-40, bibl. 6. [Ukrainian Agric. Inst. Grain Husb.]
Bacteriosis of the cobs is one of the most widespread diseases of maize in the Ukrainian SSR and the north Caucasus. Infected seeds show reduced germination and weakened vitality. To combat the disease it is recommended that, as a comparatively small number of grains in the cob are infected and these usually occur towards the apex, the tops of the cobs should be broken off and the remaining caryopses used for seed. Another measure recommended is the selection for sowing of cobs the tops of which are well covered by the husks.—R.P.J.

1002 Niel, L. L. Resumen de los ensayos realizados en el control de orugas varias del maiz. [**Summary of experiments on the control of various caterpillars on maize.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 37-9. [Dir. General Invest. Fomento Agric. Ganad., Santa Fe, Argentina]
The caterpillars considered belonged to the species *Cirphis unipuncta*, *Laphygma frugiperda*, *Thyreion gelotopoeon* and *Heliothis obsoleta*. Laboratory and field trials to control these on maize with 5 % Gammexane were carried out in 1949, and with 5 % and 20 % Gammexane in 1950. These dressings were effective against all except *H. obsoleta*, which lays its eggs inside the maize plant. Gammexane was shown to have a residual effect for 10 days in the field. The 20 % Gammexane reached its maximum effect 7 hr. earlier than did the 5 % dose.—N.G.S.

1003 Rosbaco, U. F. Determinacion del "Picado" en maices dentados y flint. [**Determination of 'picado' in dent and flint maize (in Argentina).**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 155-6. [Esta. Exptl Tezanos Pinto, Entre Rios, Argentina]
'Picado' is caused by *Sitotroga cerealella* and *Calandra* spp. In a trial with nine maize varieties it was shown that, on the average, dent maize is more affected than flint maize, although there are some dents less affected than flints.—N.G.S.

1004 Brieger, F. G. Origem e domesticação do milho. [**Origin and domestication of maize.**] *Lilloa* 1949, **20**, 37-44, bibl. 15, English summary p. 37. [Received 1951] [Luiz de Queiroz Agric. Coll., Piracicaba, São Paulo, Brazil]
The geographic origin of maize, the South American centres of its domestication and the relations between South American and Central American

maize are studied. A plea is made for the collection of the indigenous material, so important for research, which is rapidly disappearing under the advance of civilization.—G.M.R.

1005 Singleton, W. R. **The inheritance of corn grass, a macromutation in maize, and its possible significance as an ancestral type.** *Amer. Midl. Nat.* 1951, **35**, 81-96, bibl. 12.

1006 Shaw, R. H., and Thom, H. C. S. **On the phenology of field corn, the vegetative period.** *Agron. J.* 1951, **43**, 9-15, bibl. 5.

A phenology experiment was conducted in the field at Ames, Iowa, using an early, a medium, and a late variety of hybrid maize. Observations were taken on individual plants for dates of emergence, tasseling, first pollen shed, and silking. The interval from planting to emerging averaged 12.3, 11.1, and 11.8 days in 1947 and 7.9, 7.7, and 9.0 days in 1948. As the number of plants emerging per hill increased the length of this interval decreased slightly. The interval from emerging to tasseling averaged 65.1, 72.3, and 75.5 days in 1947, and 50.8, 60.1, and 63.0 days in 1948. This interval was the most variable between varieties and between years, and had the most effect on changing the time of maturity. The interval from tasseling to silking averaged 6.3, 6.1 and 8.2 days in 1947 and 5.9, 3.8, and 5.9 days in 1948. In the hot dry year of 1947 there was a rapid rate of tasseling but a slower rate of silking. In the cooler, more moist year of 1948 there was a slower rate of tasseling, but a more rapid rate of silking.—Author's summary.

1007 Dungan, G. H., and Gausman, H. W. **Clipping corn plants to delay their development.** *Agron. J.* 1951, **43**, 90-3. [Illinois Agric. Expt Sta., Urbana]

A description is given of a practical method of clipping maize plants in order to delay the onset of their reproductive phase.—P.J.B.

1008 Ganel, M. Sincronizacion de la floracion femenina y masculina del maiz en su relacion con la sequia. [**Synchronization of male and female flowering in maize, in relation to drought.**] *Agentina. Memoria de la quinta reunion de maiz* 1950, 41-5, bibl. 2. [Inst. Fitotec. La Estanzuela, Colonia, Uruguay]

The emergence of maize stigmas has a close relationship with the internal water status of the plant, and thus with the environmental humidity. During intense drought, the stigmas may not emerge till after pollen shedding, thus preventing pollination. Cases have been noted in drought years where the stigmas have not appeared until 20-30 days after pollen shedding. In laboratory experiments the converse has been observed, viz. under very humid conditions the stigmas are extruded several days before the pollen is formed. A clear correlation was observed between the number of days from the extrusion of the stigmas to the appearance of pollen and the subsequent number of grains on the ear. The shorter was this interval, the greater was the number of grains on the ear.—N.G.S.

1009 Rosbaco, U. F. Determinaciones de la absorcion de agua en maices dentados y flint. [**Determinations of the water absorption of dent and flint maize.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 167-8. [Esta. Exptl Tezanos Pinto, Entre Rios, Argentina]

In an experiment with 20 varieties, it was concluded that dent maize has a tendency to absorb rather more water than flint maize. While a dent maize absorbed the most water and a flint maize the least, some dent maizes absorb less water than some flint maizes.—N.G.S.

1010 Justino Teixeira, A. Milho de Angola. [**Maize in Angola.**] *Agron. Angolana* 1950, **4**, 3-15, bibl. 11, English and French summaries p. 13.

Although the production of maize in Angola has been steadily increasing since 1910, there is room for much greater production to meet the needs of Angola and Portugal. The article is supported by figures relating to both Angola and Portugal.—N.G.S.

1011 Abalo, R. A. Ensayo de conservacion de maiz tipo dentado y corneo, en trojes. [**Experiments in conserving dent and flint maize in small granaries.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 157-65, illus. [Esta. Exptl Pergamino, Argentina]

The practice of conserving maize in small granaries for over a year has resulted in as much as 100 % of the maize being lost due to attacks by picado (*Calandra granaria* and *Sitotroga cerealella*). The wide distribution of dent maize, supposedly more susceptible to picado than flint maize, has aggravated the difficulty. Methods of conservation were studied at Pergamino where experimental granaries were constructed, using wire netting and maize stalks. Each granary held 2000 kg. of maize in the husk, and 3000 kg. of maize without the husk. The granary tops were covered with waterproof paper. Varieties used were the flint hybrid, La Lucilla No. 1 and the dent hybrid US. 13. It was shown that applications of 5 % DDT, at the rate of 100 grains per 120 kg. of maize cobs was effective in reducing the incidence of picado. Storage in the husk was even more effective than the application of insecticide. When conserved in the husk and treated with DDT, flint maize was maintained in the same condition as when harvested, and the incidence of picado in dent maize was greatly reduced. No appreciable differences were observed in the relative susceptibility of the dent and flint maize to picado; and both responded to the different treatments in a similar fashion.—N.G.S.

1012 ROSBACO, U. F. Conservacion del maiz con chala. [**Conservation of maize in the husk.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 153-4. [Esta. Exptl Tezanos Pinto, Entre Rios, Argentina]
See Abs. 59.

MILLET AND SORGHUM

1013 ZALESOV, F. V. [**A new variety of millet.**] [Russian] *Selek. Semenovod.* 1951, **18**, No. 2. 72-4. [Kamalinsk State Sel. Sta.]
In the Krasnojar territory the millet variety Kazanskoe 506 gives high yields but its grain ripens unevenly in the panicle. The new variety Kamalinskoe 591, a selection made in 1940 from local populations of millet, is characterized by uniform ripening of the grain. In comparative trails with Kazanskoe 506, Kamalinskoe 591 ripened from 4 to 8 days earlier, yielded 2.4 centners (centner = 100 kg.) more grain per ha. and had a lower husk percentage. Kamalinskoe 591 is also resistant to lodging.—R.P.J.

1014 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 5. Los maicillos y su cultivo. [**Sorghums and their cultivation.**] By *F. M. Milam* and others. 1950, pp. 3.
Recommended spacings for sorghum are 50 × 50 cm. with 3 plants per hill, and 50 × 3 cm. if grown for silage. If sown with maize, the maize should be planted at 90 × 100 cm., alternating with sorghum in the row, thus leaving 40 cm. between each plant, and 100 cm. between each plant of the same species. This method is not recommended as harvesting is hindered. If the sorghum is sown between the maize rows when the maize begins to ripen, the maize should be sown 90 × 50 cm. and the sorghum should then be sown between the maize rows, with 50 cm. between hills and 5 plants to the hill. Three cultivations are required to control weeds. Sorghum varieties recommended are Grohoma, Hegari, Arizona Hegari, Kalo and Shallu. Hegari, Arizona Hegari and Shallu give three times the yield of the common local variety.—N.G.S.

1015 ALABOUVETTE, L., and COTTE, A. Essais de sorghos à grain. [**Trials with grain sorghum.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 78-81.
In the south and south-east of France, where yields of *Zea mays* are low owing to insufficient rainfall, sorghum has been tried as a spring cereal. Since sorghum requires a higher temperature for germination than does maize, in this region it is sown during the 3rd week in May. When sorghum and maize were grown under exactly similar conditions, all varieties of sorghum gave higher yields than the best variety of maize. Earliness is an important characteristic in sorghums grown in this region. When earliness, yield and convenience of harvesting are taken into account, the varieties recommended are S. 40 and Early Hegari.—D.B.

1016 DEODIKAR, G. B. ***Sorghum versicolor* Anderss—a species highly resistant to *Striga*.** *Curr. Sci.* 1951, **20**, 135-6. [Econ. Bot. Dept, Coll. Agric., Poona 5]
In pot trials with 35 varieties of Sorghum, *Sorghum versicolor* proved highly resistant to parasitism by *Striga lutea* and *Striga densiflora*. *Sorghum purpureosericeum* and *Sorghum nitidum* also gave indications of resistance.—N.G.S.

1017 TULLIS, E. C. ***Fusarium moniliforme*, the cause of a stalk rot of sorghum in Texas.** *Phytopathology* 1951, **41**, 529-35, bibl. 19.
The following sorghum varieties were found resistant to *Fusarium moniliforme*: Texas Blackhull, Kafir, Feterita (F.C. 811), Extra Early Sumac and those varieties with resistance to charcoal rot (*Macrophomina phaseoli*).—P.J.B.

RICE

1018 CHANDRARATNA, M. F. **Report on a random sample survey of paddy yields in the Kandy, Kegalla and Ratnapura Districts [of Ceylon].** *Trop. Agriculturist* 1950, **106**, 56-74.
This rice survey includes information on local manurial practices, cultivations and variety preferences, all of which are interpreted in terms of yield.—N.G.S.

1019 RHIND, D. **The improvement of paddy yields in Ceylon.** *Trop. Agriculturist* 1949, **105**, 64-8. [Received 1951]

1020 TROPICAL AGRICULTURIST. **Rice production in Australia.** *Trop. Agriculturist* 1950, **106**, 82-4.

1021 FERNANDO, L. H. **The performance of the salt resistant paddy, Pokkali, in Ceylon.** *Trop. Agriculturist* 1949, **105**, 124-6. [Received 1951] South-East Division Ceylon]
The rice variety, Pokkali, grows well on saline soils, is apparently highly sensitive to photoperiod, but does not resist floods. On a very acid peaty soil of pH 4.0, the maximum salinity tolerated was

0.22 %. Seed paddy should be well sprouted before sowing, since salt inhibits germination. There is a complete absence of anthocyanin in Pokkali. There are indications that it is not a pure line.—N.G.S.

1022 Fernando, L. H. **Studies in Ceylon paddies. 1. Investigations on varieties grown in the Hambantota District.** *Trop. Agriculturist* 1950, **106**, 162-70, bibl. 5.

Rice variety trials at Ambalantota and Tissamaharama over both monsoon seasons for three years indicate that Suduheenati ICPY-15 is the best of the 3.5 month paddies cultivated in the Hambantota District.—From author's summary.

1023 La Chacra. Chacarero F.A. La primera variedad de arroz argentina. [**Chacarero F.A. The leading Argentinian rice variety.**] *La Chacra* 1951, **21**, No. 246, 6-8, illus.

1024 Pergolani de Costa, Juana I. El pajaro denominado "varillero" o "Congo" *Agelaius ruficapillus ruficapillus* Veillot como plaga de los arrozales en Santa Fe. [**The bird *Agelaius ruficapillus ruficapillus* as a plague of the rice fields in Santa Fe (Argentina)**.] *Publ. Inst. San. Vegetal* Ser. B. 1950, **6**, pp. 14.

The bird *Agelaius ruficapillus ruficapillus*, known as Varillero or Congo is a serious pest of growing rice. A method of netting these with the aid of live decoys is described.—N.G.S.

1025 Datta, R. M., and Paul, A. K. **Morphology of the ovary of *Oryza sativa* Linn. var. *plena* ("double rice").** *Science* 1951, **112**, 491, bibl. 4. [Jute Agric. Res. Sta., Hooghly, West Bengal, India]

From evidence presented, the authors conclude that "double rice" is due not only to the presence of 2, or more, ovaries, but also to the presence of more than one ovule (generally two) in each such ovary.—P.J.B.

1026 Núñez, O. Interpretación morfológica de la espiguilla de arroz. [**Morphological interpretation of the rice spikelet.**] *Ciencia Invest.* 1951, **7**, 230-4, bibl. 11. [Esta. Exptl Arroz, Fac. Agron. La Plata, Argentina]

1027 Aroyo, B. C. Ensayo de abonamiento de arroz. [**Rice fertilizer experiment.**] *Suelo Tico* 1950, **4**, 104-9

In a fertilizer experiment with the rice variety Berlin, it was shown that K had no effect. Greatest yields were obtained by a combination of N and P; the optimum proportions require to be determined. A further experiment with N,P and Ca is to be carried out.—N.G.S.

1028 Rhind, D., and others. **Seed placement of phosphates in paddy. I. Preliminary experiments on the application of phosphate solutions to seed.** *Trop. Agriculturist* 1949, **105**, 98-108, bibl. 2. [Received 1951]

In pot experiments at Peradeniya with the pure paddy line, Pachchaiperumal 2462/11, significant increases in the yield of both grain and straw were obtained from plants grown from seed soaked in phosphate solutions. Forty-eight hours' soaking in 5, 10 and 20 % K_2HPO_4 produced significant increases in the yield of grain of 20.3, 18.8 and 36.2 % over the control. Forty-eight hours' soaking in 10 and 20 % Na_2HPO_4 gave significent increases in the yield of grain of 36.2 and 29 % over the control. Soaking in phosphate solutions delayed germination, the delay increasing *pari passu* with the concentration of solution and duration of soaking. The same yield increases were not obtained in field trials although there were early signs of superior vegetative vigour in the plants grown from phosphate soaked seed. The varieties used in these field experiments were Pachchaiperumal 2462/11, Dahanala 37 YM 2014, Vellai-ilankalyan 28061 and Honderawala 868.—N.G.S.

GENERAL

1029 Waal, D. de. De cultuur van gemengd graan in Denemarken. [**The growing of grain mixtures in Denmark.**] *Maandbl. LandbVoorl-Dnst* 1951, **8**, 137-45, bibl. 7. [Netherlands Embassy, Copenhagen]

The growing of grain mixtures increased enormously in Denmark from 1920 to 1930, especially on the lighter, sandy lands of Jutland, but since 1934, and as measures for soil improvement progress, there has been a steady diminution of the practice throughout the country. Except for poor, very light sands, the practice cannot be justified, particularly since it results in a great increase in the occurrence of the oat eelworm. The commonest mixture used is barley/oats, which may be considered a step towards the substitution of barley for oats. Trials of other mixtures are in progress with a view to eliminating the oats. The yield and fodder value of a mixture are, in general, lower than those of the better component.—G.M.R.

1030 Edinburgh and East of Scotland College of Agriculture. Bull. No. 25. **Grain production. Report on conference held in Perth, August 1950.** 1950, pp. 55.

This includes an article on oat and barley varieties (pp. 14-23).—E.B.H.

1031 Canada, The Alberta Varietal Zonation Committee. **Varieties of grain for Alberta.** 1951, pp. 7.

1032 CAMBRIDGE, National Institute of Agricultural Botany. Seed Production Committee. **Seed notes No. 34.** 1950, pp. 6.

These notes include an account of the Cereal Seed Crop Inspection Scheme.—E.B.H.

1033 STAFFELD, U. Einfluss der chemischen Zusammensetzung des Kornes auf den Ertrag. [**Effect of the chemical composition of the seed upon yield.**] *Dtsch. Landw.* 1951, **2**, 136-41, bibl. 23. [Berlin]

The subject is discussed with special reference to cereals. The chemical composition of the seed is the decisive factor in the production of sound, vigorous plants and of reliable and good grain yields; but the influence of climate is also so important that the systematic testing of pedigree strains in the different climatic zones, already mapped, is extremely desirable.—G.M.R.

1034 NORTHERN IRELAND, Monthly Report of the Ministry of Agriculture. **Higher yields from less seed.** *Mon. Rep. Minist. Agric. N. Ire.* 1951, **25**, 305-6.

The dressing of oat, barley and wheat seed with organo-mercury preparations, sold under various trade names such as Agrosan GN, Ceresan, Lunasan and Abavit, ensures a higher crop yield and permits a saving of 30 to 40 lb. of seed per acre compared with the normal sowing rate. The quantity of dressing used is approx. 2 oz. per 42 lb. of oats, or 56 lb. of barley, or 63 lb. of wheat. The value of the seed saved is more than treble the cost of the treatment.—E.B.

1035 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 17. Prevención de enfermedades llevadas en las semillas. [**Prevention of seed-borne diseases.**] By *B. S. Crandall* and *L. Abrego*. 1950, pp. 3.

Recommendations are given for seed treatment of sorghum, rice, wheat, oats and maize with Agrosan-GM, Spergon-SL-DDT, Granosan, Phygon-XL-DDT, and Arasan 45. Spergon-SL-DDT, and Phygon-XL-DDT should be applied to the seed soon after harvesting as the DDT element gives protection against insects in storage.—N.G.S.

1036 COPPENS, R., and PLAETSEN, J. van der, L'influence des désinfectants commerciaux sur le pouvoir germinatif des grains. [**Influence of commercial disinfectants on the germination capacity of seeds.**] *Rev. Agric.* 1950, **3**, 260-6. [Lab. d'Analyses de l'État, Gand, Belgium]

Seed of wheat, oats, barley and rye were studied. The moisture content of the seed at the time of disinfection, or shortly afterwards, had no effect on germinating capacity, but seed stored in moist conditions did not germinate well, whether disinfected or not. Disinfectants in which mercury was the active constituent did not influence germination unfavourably. Of compounds in which copper was the active constituent, one, which had a slightly alkaline reaction, did not diminish germination; another, which had an acid reaction, reduced germination, but after neutralization with chalk it did no further harm. A responsibility lies with the manufacturer to test his products on different crops.—D.B.

1037 JAMESON, H. R., and others. **The control of wireworm by gamma benzene hexachloride: the development of a seed dressing for cereals.** *Ann. appl. Biol.* 1951, **38**, 121-34, bibl. 1.

In field trials for the control of wireworm, the optimum concentration of γ-isomer of BHC was 20 to 30 % in a 2 oz./bu. cereal grain dressing which also included an organomercurial seed disinfectant. The 20 and 30 % dressings were harmless to plant germination and growth. The 50 % dressing slightly retarded emergence but the effect disappeared about 10 weeks after sowing. The 70 % dressing very seriously retarded emergence and the plots were inferior to the controls 10 weeks after sowing. Grain yields were not significantly reduced even at the 70 % level of γ-BHC.—Extract.

1038 KARPOVA, A. I. [**Protection of seedlings of spring and winter cereals from injury by the Swedish fly by treatment of the soil with hexachlorane.**] [Russian] *Doklady Vsesojuz. Akad. S-H. Nauk.* 1950, **15**, No. 2, 33-8. [All-Union Sci. Res. Inst. Plant Protect.]

The introduction into the soil of a 5 % mixture of hexachlorane with phosphorite meal during cultivations before sowing spring and winter cereals reduced the percentage of injury by the Swedish fly. Dusting moist seeds of the cereals two hours before sowing with the mixture at the rate of 10 grm. per 1 kg. seed gave a similar result. The introduction into the soil of hexachlorane and phosphorite meal did not have a deleterious effect on germination or on the development and yield of the cereal crops. A slightly depressing effect on the plants in the initial stage of their development following presowing dusting of the seed with the mixture was levelled out during subsequent growth.—R.P.J.

1039 BERNFUS, E. Lagertechnik. [**Storage technique.**] *Bodenkultur* 1950, **4**, 317-28, bibl. 8.

The paper is largely a literature review. The crops discussed include cereals, which are considered from the standpoint of aeration and water content. —D.B.

1040 DEBOEK, P. J. La conservation du grain en silos. [**Storage of grain in silos.**] *Rev. Agric.* 1950, **3**, 740-51. [Service d'Inspection des Meuneries, Belgium]

The paper is limited to an account of the loss of grain caused by insects and parasites, the organisms involved, the conditions favouring their depredations, and the means of reducing losses. Fumigation is the only effective control measure; empty silos are treated with hydrocyanic acid and full silos with methyl bromide, ethylene oxide and methyl formate. The procedure for treatment is described.—D.B.

LEGUMES

SOYABEAN

1041 BAYER, G. Ertragssteigerung durch Anbau der Sojabohne, ein Beitrag zur Erfüllung des Fünfjahrplans. [**Increasing yield through soyabean growing, a contribution to the fulfilment of the five-year plan.**] *Dtsch. Landw.* 1951, **2**, 121-6. [Dresden]

An exposition is presented of methods of intercropping soyabeans with plants which develop either before, simultaneously with, or after the soyabeans.—G.M.R.

1042 ISRAEL, Rehovot Agricultural Research Station. Bull, 56. **Introduction of soybean into Israel and its problems.** [In Hebrew.] By *S. Hurwitz* and *E. Goldin.* 1950, pp. 43-76, illus., bibl. 19, English summary pp. 13-17.

Trials with soyabean were carried out from 1935 to 1944 at the above Station to study this crop, to select suitable varieties and to determine the best sowing and harvesting dates. Particular points studied were pod splitting, seed viability, and seed vernalization. Seventy varieties of soyabean were imported from various countries for this investigation. The highest bean yields under irrigation were obtained from the varieties Wood's Yellow, Haberlandt, Creole, Jaune Grain, White Biloxi, Palmetto and Missoy; and, without irrigation, from the early varieties Dunfield, Macoupin and China. The best sowing depth appeared to be 3 to 5 cm. Soyabean for seed was successfully grown in close drills and also at distances of up to 70 cm. between the rows. It was found that the best harvest time was during the transition from the yellow to the fully mature stage when in this region the moisture content of the seed is 25 to 30 %.—From English summary.

1043 CASTELLI, T. La coltivazione della soia in Italia. [**Soyabean cultivation in Italy.**] *Ann. Fac. Agr. Univ. Perugia* 1943, **2**, 21-30, bibl. 11. [Received 1951]

1044 SEARS, O. H., and LYNCH, D. L. **Importance of inoculation [for soyabeans].** *Soybean Digest* 1951, **11**, 15-17. [Agron. Dept Illinois Univ., Urbana]

Trails were carried out using two sister soyabean strains selected from Lincoln × (Lincoln × Richland) crosses, one of which (a high protein strain) nodulated freely under favourable conditions while the other (a low protein strain) was completely devoid of nodules under the same conditions. Seed of the two strains was inoculated and planted in plots well supplied with available Ca, K and P. Where the plots were treated with 300 lb. per ac. of ammonium nitrate, soyabean yields were 38.6 and 38.3 bu. per ac. for the high and low protein strains, respectively. Where no N was applied, seed yields were 36.0 and 29.2 bu. per ac., and where 5 tons per ac. of straw mulch was applied, yields were 35.5 and 20.9 bu. per ac., respectively. Where the soil was low in available N, 63 % of the N in the crop was derived from the air; where 300 lb. per ac. of ammonium nitrate was applied, 21 % of the total N in the crop was derived from the air.—P.J.B.

1045 JOHNSON, H. W. **Soybean seed treatment.** *Soybean Digest* 1951, **11**, No. 7, 17-20. [Dis. and Forage Crops Div., Plant Industry Bureau, US Dept Agric.]

Trials were carried out during 1947-50 at Stoneville, Mississippi, to determine the effect on the seed yield and seedling emergence of soyabeans following seed treatment with a number of different seed-protectants. Seed treatment with Arasan, Spergon and Vancide 51 (the latter in 1950 only), resulted in highly significant increases in seedling emergence, compared to controls. In 1949, seed-yield increases were significant only in the case of Arasan; in 1950, seed-yield increases were significant for Vancide 51 and Spergon, only. Seed-yield increases were not obtained by treating the seed of varieties having good powers of germination, thus indicating the relatively greater benefits of seed treatment to poor quality seed than to that of good quality. Seed treatment had no significant effect on the nodulation of soyabean plants grown in soil that had grown nodulated soyabeans previously. Where soyabeans have not been grown before, it is not thought that seed treatment should be carried out, since such treatment impairs the efficiency of inoculation. Where both seed treatment and inoculation are desirable, seed inoculation should be carried out as near to the time of sowing as possible, and the seed sown in moist soil only. In trials with seed treated with either Arasan, or Spergon, at a rate of 2 oz. per bu., the seedling emergence from seed stored for 6 months and 1 year was significantly higher than that of untreated seed stored for the same periods of time. Ceresan dusts, owing to their volatile nature, were not effective as seed protectants for seed stored for the same periods of time.—P.J.B.

1046 LONGSTAFF, W. H., and GRAHAM, E. R. **Release of mineral magnesium and its effect on growth and composition of soybeans.** *Soil Sci.* 1951, **71**, 167-74, bibl. 11. [Missouri Agric. Expt Sta., Columbia]

Soyabean plants were grown in sand cultures containing different Mg minerals to investigate the release and availability of Mg from the minerals and to determine the effect of the Mg released on the growth and composition of the soyabean plants. Results showed that N fixation by the plants was increased by 59 and 91 % in cultures containing magnesite and dolomite minerals, compared to controls containing no available Mg. The N-content of the plants did not increase until significant amounts of Ca were present in them. The N-content increases subsequent to Mg uptake by the plants appeared to be the result of the fact that the Ca content of the plants increased in proportion to their Mg uptake. Available Mg increased plant growth by 57 to 130 % compared to that of the controls.—P.J.B.

1047 HIVON, Katharine J., and others. **Ascorbic acid and ascorbic-acid-oxidizing enzymes of manganese-deficient soybean plants grown in the field.** *Soil Sci.* 1950, **71**, 353-9, bibl. 14. [Purdue Univ. Agric. Expt Sta., Lafayette, Ind.]

In experiments in which soyabeans were grown on Mn deficient soil, no consistent relationship was found between the Mn nutrition of the plants and their ascorbic acid content. A small, but not conclusive, inverse relationship was noted between the Mn nutrition of the plants and the ascorbic acid-oxidizing activity of their leaves. Where applications of 4 tons per ac. of lime were made on Mn deficient soils, Mn deficiency symptoms were ess severe on the limed plots than on the untreated plots.—P.J.B.

GROUNDNUT

1048 PREVOT, P., and COMMUN, R. L. Désinfection des semences d'arachide. [**Disinfection of groundnut seed.**] *Oléagineux* 1951, **6**, 1-10, fig. 3, tbl. 12, bibl. 2.

Fungi, bacteria and insect pests are reputed to cause great losses in groundnut seedlings in tropical Africa. Losses are greater after mechanical shelling which injures the seed. Two series of trials were arried out in 1950 in the Middle Congo, French Equatorial Africa, and in Senegal to test various commercial anticryptogamic preparations produced in France. Seed treatment with these preparations at 3 different doses gave variable, but always considerable, increases both in sprouting and pod yield. Some of the preparations tested are considered of particular interest, namely, two preparations the composition of which is not given, tetramethylthiurame disulphide, two organic mercury compounds and one product containing an organic mercury compound plus the γ-isomer of HCH. Other products, which are indicated, were also effective. Trials are continuing. Treatment of groundnut seed with these anticryptogamic preparations is considered economical.—E.B.

1049 PREVOT, P., and COMMUN, R. L. Effet secondaire des désinfectants employés pour les graines d'arachide. [**Secondary effect of the disinfectants employed on groundnut seeds.**] *Oléagineux* 1951, **6**, 216-20.

[See Abs. 1048] The results of trials of groundnut seed disinfection carried out in Senegal in 1950 showed that the increase in yield obtained with the use of the anticryptogamics was not due only to a higher percentage of sprouting. There was a secondary effect due to a greater percentage of healthy plants in the treated plots than in the control plots. The yield per single healthy plant in the treated plots was also slightly higher. This secondary effect of the disinfectants gave additional increases in yield varying from 10 to 213 % compared with the control, and appeared to result from a speedier growth of the seedlings.—E.B.

1050 GALAHOV, P. N. [**The effect of hexachlorane on the acacia aphis attacking *Arachis*.**] [Russian] *Sovet. Agron.* 1950, **8**, No. 12, 87-91. [All-Union Res. Inst. Oil Crops]

To reduce the numbers of acacia aphis on *Arachis* [species not stated] to such an extent that the pest is of no agricultural significance, it is sufficient to dust the crop once with a 12 % powder of hexachlorane at the rate of 20 kg. per ha., or to spray it once with a 1 % suspension of this powder at the rate of 1000 litres of the solution per ha.—R.P.J.

1051 WIERSUM, L. K. **Water transport in the xylem as related to calcium uptake by groundnuts (*Arachis hypogaea* L.)** *Plant and Soil* 1951, **3**, 160-9, bibl. 19. [Bot. Inst., General Agric. Expt Sta., Bogor, Indonesia]

Reports have indicated that the gynophore and young fruit of the groundnut must themselves absorb the Ca necessary for their own growth and that no Ca is transferred from the stem to the gynophore, though this is not the case for other minerals. The experiments reported were carried out to determine the reason for this lack of transfer of Ca from the stem to the developing fruit. The course of the transpiration stream in the plant was followed by cutting off part of the root system to permit the entry of dyes into the plant. When the fruits were exposed to the air, the dyes moved down from the stem to the gynophores and fruits, but when held in moist soil, no transpiration took place from the fruits, and the dyes did not move even as far as the base of the gynophores. From these experiments it was concluded that, under normal field conditions, the water necessary for the transport of Ca does not move down the xylem from the stem into the fruit.—P.J.B.

1052 FERRAND, M., and PREVOT, P. Utilisation des engrais sous forme de pastilles pour l'arachide. Premier essai effectué au Sénégal (1950). [**Use of fertilizers in the form of pellets for groundnuts. First trial carried out in Senegal in 1950.**] *Oléagineux* 1951, **6**, 191-4, bibl. 5.

1053 CHAUSSON, J., and OLLAGNIER, M. Fumure minérale de l'arachide en Casamance (Sénégal). Premiers résultats obtenus en 1950. [**Chemical manuring of groundnuts in Casamance, Senegal. First results obtained in 1950.**] *Oléagineux* 1951, **6**, 256-63, bibl. in text.

1054 BUTT, J. L., and KUMMER, F. A. **Artificial curing of peanuts [groundnuts].** *Agric. Engng, St. Joseph, Mich.* 1951, **32**, 27-30, bibl. 2. [Alabama Agric. Expt Sta., Auburn]

For Alabama conditions, the artificial drying of groundnuts is recommended only as a measure of insurance in unfavourable seasons. Groundnuts with a moisture content of 52 % were placed in containers to a depth of 18 in. Determinations were made of the amount of moisture removed from each 3-inch layer by air at a temperature of 115°F., at two rates of air flow. At an air-flow rate of 13.25 cu. ft. per min. per sq. ft., the zone of drying was too narrow to permit of drying in all layers within 12 hr. At an air-flow rate of 28.8 cu. ft. per min. per sq. ft., drying occurred at all layers. Intermittent drying was shown to reduce the total drying time, compared to continuous drying. A number of groundnut driers that have been used in Alabama, are described. These include rotary kiln, column, batch-type driers and installations for drying groundnuts in the sack.—P.J.B.

1055 KERR, J. A., and CARTMILL, W. J. **Peanut [groundnut] growing in Queensland.** *Qd agric. J.* 1951, **72**, 63-76.

BEAN

1056 AHLAWAT, M. R. **Punjab.** *Indian Fmg* 1950, **11**, 349-50 [Govt Agric. Coll., Ludhiana]

The mung bean (*Phaseolus radiatus*) varieties Nos. 54 and 509 are recommended by the Department of Agriculture for cultivation on the plains of the Punjab, India. Strain No. 1/49 of a Chinese mung variety has given promising results at Kulu, about 4000 ft. a.s.l. It has given an average increase of 89 % over the local variety in the last three years, the seed being over twice as large. The American cotton L.S.S. proved very suitable for the irrigated areas in Ferozepore district. An early American cotton, Hariana Kapas (216F) has been released for cultivation in the south-eastern district of the Punjab.—N.G.S.

1057 SIVORI, E. M. Traslado del ácido 2-4-diclorofenoxiacético en "*Vicia faba.*" [**Translocation of 2,4-D in *Vicia faba.***] *Lilloa* 1949, **19**, 43-8, pl. 3, bibl. 5. [Received 1951] [Fac. Agron., Univ. La Plata, Argentina]

Experiments are described which show that in *Vicia faba* the translocation of 2,4-dichlorophenoxyacetic acid takes place in conjunction with that of the carbohydrates, not only from leaf to stem, but also from stem to stem of the same plant. If the treated part of a plant (in this experiment an upper leaf) is kept in the dark for 72 hours before treatment and again for 48 hours after treatment and is then cut off, no action of 2,4-D is discernible in the remaining parts of the plant.—G.M.R.

1058 GARESE, P. Efectos de los ácidos naftalene acético y 2,4-diclorofenoxiacético en *Phaseolus aureus* y *Ph. vulgaris*. [**Effects of naphthalene acetic acid and 2,4-dichlorophenoxyacetic acid upon *Phaseolus aureus* and *Ph. vulgaris.***] *Lilloa* 1949, **19**, 29-35, English summary p. 29, pl. 2, bibl. 8. [Received 1951] [Boyce Thompson Inst. Plant Res., USA]

Seeds of the two *Phaseolus* spp. were treated for 24 hours with NA and 2,4-D in concentrations ranging from 5 to 100 mg. per litre before sowing. It was found that NA has a more marked effect than has 2,4-D upon *Ph. aureus*, producing shortening of the stem and a reduction in the size of the leaves. High concentrations can be toxic. Low concentrations induce increased root formation. On *Ph. vulgaris*, on the other hand, 2,4-D has a greater effect and acts as a powerful inhibitor, reducing the size of the leaves and modifying their shape and structure. The highest concentrations killed this species.—G.M.R.

1059 DORMER, K. J., and PLACK, R. L. **A quantitative study of shoot development in *Vicia faba.* 2. The elongation of internode and petiole.** *Ann. Bot., Lond.* N.S., 1951, **15**, 157-73, bibl. 5. [Bot. Dept, Univ. Manchester]

OTHER

1060 Singh, M. P. **Pest control work in Mokameh Tal.** *Indian Fmg* 1950, **11**, 336-9. [Dept Agric., Bihar]

Operations against the gram cutworm *Agrostis ypsilon* were carried out in Mokameh Tal, Bihar, during 1947-9. (Tal is land which is under flood during the monsoon, and can thus only be used for rabi crop cultivation, i.e. in the Sept.-Oct. N.E. monsoon period.) Gram, *Cicer arietinum*, is only susceptible to attack during the first 22 days of growth. The destructive period of attack is from the last week of October to mid-November. Thus early and late sowing gives a measure of control. It was found that by treating the soil with 3.5 % DDT before sowing and by dusting with 4 % DDT [quantities not stated] after the crop was attacked, losses could be considerably reduced.—N.G.S.

1061 Lamberts, H. Enting van gele voederlupine. [**Inoculation of yellow sweet lupin.**] *Landbouwk. Tijdschr.* 1951, **63**, 187-8, English summary p. 187.

Inoculation of yellow sweet lupin with pure *Rhizobium* strains depressed the yield of dry matter in comparison with the uninoculated control. The control showed also the highest protein yield, with one exception. Testing *Rhizobium* strains for activity in pot cultures only does not seem to be sufficient.—Author's summary.

ROOTS

SUGAR BEET

1062 Flamini, B. Il problema dell'investimento nella coltura della barbabietola. [**The spacing problem with sugar beet.**] *Industr. saccar. ital.* 1951, **44**, 78-100, bibl. 67. [Ist. Agron. Univ. Bologna, Italy]

A spacing trial was carried out in 1950 at Migliaro, near Ferrara, Italy, on soil of medium clay, with the 3 principal commercial varieties of sugar beet employed in Italy, namely, Cambier P., Cesena N and Mezzano Z. Each variety was grown at the following initial densities: 5.0, 6.66, 8.25, 10.0, 12.12, and 15.15 plants per sq. m, each treatment being reapeated 6 times. Sowing took place on 13th March, sprouting on 24th March, thinning on 27th April. Part of the beets was harvested on 21st August, and part on 20th September. Although the climate of the year was unfavourable to beet, the average root yield from the 2 harvests was 376, 301, and 274 q./ha respectively for the 3 types, the root yield being almost the same from each of the 6 spacing rates. The results of this trial confirmed as a whole those obtained by A. Aldrovandi in 1949 (see Abs. 420). As the weight of the single roots was greater in relation to the greater space available to the plant there was a slight but constant decrease in the sugar content, particularly in the types P and N. The sugar content was higher in the beet collected on 21st August than in those collected on 20th September. It is concluded that, if all factors are taken into consideration, the best initial density is 9 to 10 plants per sq. m. (about 40 × 25 cm.) which generally gives 7.5 to 8 plants at harvest. If conditions are unfavourable and losses in young plants are expected, the initial spacing should be increased to 12 to 14 plants per sq. m. by reducing the distance between the rows. —E.B.

1063 Paliĭ, Y. F. [**Combined insecticides to combat *Tanymecus palliatus* F.**] *Sovet. Agron.* 1950, **8**, 85-6. [Ramon Expt-Sel. Sta.]

In 1950, large numbers of *Tanymecus palliatus* were noted on sugar beet plantings at the Station. Spraying at the rate of 300 litres per ha. with a 5 % solution of barium chloride containing 10 kg. hexachlorane powder in suspension and 3 to 4 kg. of molasses, showed an effectiveness of 98.5 % compared with 59 % when hexachlorane was applied as powder at the rate of 20 kg. per ha.—R.P.J.

1064 Cambridge, National Institute of Agricultural Botany. Seed Production Committee. **Seed Notes No. 32.** 1950, pp. 6.

This memorandum on the control of virus yellows in sugar beet and mangold seed crops is by Dr. R. Hull, Rothamsted Experimental Station. The practice of raising stecklings in areas comparatively free from aphids and sources of virus infection is strongly recommended. The use of cover crops (barley or linseed), and spraying with Parathion or Pestox III have also yielded promising results.—E.B.H.

1065 Watson, M. A., and Watson, D. J. **The effect of infection with beet yellows and beet mosaic viruses on the carbohydrate content of sugar-beet leaves, and on translocation.** *Ann. appl. Biol.* 1951, **38**, 276-88, pl. 1. [Rothamsted Expt Sta., Harpenden, Herts.]

The loss of total carbohydrate (sugars and starch) per cent of residual dry matter (dry matter less total carbohydrate) during a period of darkness from leaves of sugar-beet plants infected with yellows virus was as great as that from the leaves of healthy plants. The conclusion of previous workers, based on the results of the Sachs iodine test for starch and the occurrence of 'phloem gummosis' in infected plants, that starch accumulates in infected leaves because translocation is prevented by blockage of the sieve-tubes, is therefore incorrect. Older leaves of infected plants had a higher content of reducing sugars and sucrose, and usually but not invariably of starch, both at the beginning and end of the dark period, than comparable leaves of healthy plants. By far the greater part of the increase was in reducing sugars. In leaves taken in late September from infected plants growing in the field, 20 % or more of the total dry matter was present as reducing sugars. The reducing sugars in both healthy and yellows-infected leaves were shown by paper chromatography to be glucose and fructose in approximately equal amounts. Accumulation of carbohydrate in infected leaves is probably not a passive consequence of differences in carbohydrate production, distribution and utilization, but is attributable to changes in the physiology of the cells of the leaf. The carbohydrate content of sugar-beet leaves was little affected by infection with beet mosaic virus. Yellows-infected leaves had a lower water content per cent of fresh weight than healthy leaves. This was accounted for by the higher carbohydrate content of infected leaves, for the ratio of water : residual dry matter was not affected by infection or was slightly reduced. This implies that hydration was independent of carbohydrate content.—Authors' abstract.

SWEDE TURNIP

1066 Nissen, Ø. Forsok med stammer av kålrot 1946-1949. [**Strain trials with swede turnips in Norway 1946-1949**] *Forskning og Forsøk i Landbruket* 1950, **1**, 581-600, bibl. 10.

Trials with strains of swede turnips were conducted from 1946 to 1949 at experiment stations in the districts of Jæren, Ås, Hedmark and Trøndelag. In addition to some Swedish and Norwegian strains, 11 Danish strains were tested. On the average of all the trials the Danish strain of Bangholm Øtofte X, gave the highest yield. In two districts (Jæren and Trøndelag) the best Danish strains of the Wilhelmsburger type gave as high a yield as Bangholm Øtofte X. Three Norwegian strains, Bangholm Olsgaard from Rogaland, Bangholm Gokstad from Vestfold and Bangholm Hunsballe Vidarhov I were approximately equal in yield to the Danish strains. The other Norwegian strains and the Swedish strains were markedly inferior. There was no indication that the strains reacted differently to varying growth conditions (measured by the average yields).—R.P.J.

YAM

1067 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 21. El ñame y su cultivo. [**The yam and its cultivation.**] By *M. A. Flores A.* 1950, pp. 3.

The recommended yam varieties are :—Barbados, Ceylán, Ceylán Morado, Vino, Florida, Papa, Agua and Guinea Blanco. Yams (*Dioscorea* spp.) can be grown from sea level up to about 600 m. a.s.l. ; they should be sown in ridges, 1 m. part and raised 30 cm. above ground level, at a depth o 10 cm. in the ridges. Planting should take place in March-April and harvesting about 10 months after sowing, according to the variety.—N.G.S.

GENERAL

1068 Brummer, V. Juurikasvit. [**Root crops.**] *Siemenjulkaisu* 1950, 71-5, English summary p. 75. [Tammisto Plant Breed. Sta., Malmi Finland]

Selection work in Finland has been restricted to the trial cultivation of foreign root-crop strains to obtain guidance for the purchase of seeds from abroad. Attention has been paid throughout to the technique of seed cultivation with cruciferous root plants. The small seedling method developed at Tammisto has already been successfully applied.—From author's summary.

FIBRE CROPS

COTTON

1069 Arizona Agricultural Experiment Station. Bull. 233. **Cotton planting.** By *W. I. Thomas* and others. 1951, pp. 17, pl. 11.

Practical recommendations for sowing cotton are given, including details of a number of different methods of sowing.—P.J.B.

1070 Rossin, — Les possibilités de la culture cotonnière au Maroc. [**Possibilities of cotton cultivation in Morocco.**] *C. R. Acad. Agric. Fr.* 1950, **36**, 307-11.

Cotton cultivation has not hitherto been carried out on a large scale, but it has been under experiment for many years. Now that a greater area of Morocco is under irrigation and cotton prices are high, interest is being taken in this crop. Since, under irrigation, the cost of production is high, only those varieties which have a high market value can be cultivated. Cotton cultivation can be well integrated into the rotation system for food crops. A 2-year rotation would be planned as follows : (a) cotton from March to October ; (b) cotton stalks destroyed end of October and wheat sown end of November ; (c) wheat harvested in May ; (d) stubble ploughing in August and sowing of *Trifolium alexandrinum* ; (e) two or three cuts of *T. alexandrinum* taken from December to February ; and (f) use of last cut of *T. alexandrinum* as green manure. The preparation of ground and the sowing of cotton is repeated anew at end of March. Summer forage is provided by a long (4-6 year) course of *Medicago sativa* grown concurrently with the crops in the rotation fields. Six to eight cuts are taken. In course of time the lucerne area is used for the 2-year rotation. The suitability for cotton of several districts in Morocco is discussed.—D.B.

1071 ROSE, M. F. **The Nuba mountains [A. E. Sudan] cotton crop: some factors affecting yield.** *Emp. Cott. Gr. Rev.* 1951, **28**, 103-13, bibl. 9.

The experimental results presented in this paper were obtained at Kadugli during 1946-9. The area of the rain-fed cotton crop of the Nuba mountains is defined and recommendations are made for increasing production from the land by sowing the early and more prolific variety BAR.SP. 84 and by improving cultural methods. The five factors affecting yield—planting date, spacing, plants per hill, seed rate and thinning date—are discussed in detail and recommendations are made for their application to local conditions.—K.L.

1072 CORCELLE, P. Quelque reactions du cotonnier aux influences météorologiques. [**Some reactions of cotton to meteorological influences.**] *Cot. Fib. trop.* 1950, **5**, 35-40, bibl. 3.

At the INEAC Station of Bambesa, Belgian Congo, an investigation was carried out from Sept. 1947 to June 1948 with 3 groups of cotton plants: (a) plants sown at normal time on normal soil (clayey and lateritic), (b) plants sown at normal time on poor soil (sandy and gravelly), and (c) plants sown late on soil as in (a). The opening of the flowers was related to the amount of insolation received 3 days before. It was concluded that sunshine increases the number of flowers per plant per season. However, the number of flowers which will give ripe bolls is dependent on the physiological possibilities of the plant and on the nutritive elements in the soil, and is influenced by a deficiency or excess of water. A deficiency of water in the soil (drought) caused a higher boll shedding in (b) than in (a), while an excess of rain caused a higher boll shedding in (a) than in (b). A similar relationship was found with regard to leaf fall.—E.B.

1073 ARIZONA Agricultural Experiment Station. Bull. 235. **Cotton cultivation with tractors.** By *E. Holekamp* and others. 1951, pp. 20.

1074 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 17. Distanciamento y poda de suspensión del algodonero. [**Spacing and topping of cotton.**] By *J. M. Cano* and *G. A. Castro*. 1950, pp. 3.

Optimum spacing is recommended as 90 × 30 to 45 cm. The practice of topping cotton is not considered beneficial.—N.G.S.

1075 SOUTH AFRICA Department of Agriculture. Sci. Bull. No. 308. **Cotton and its pests in South Africa. Ratooning as a threat to the revival of cotton-growing in the Union.** By *R. C. Rainey*, and *B. Smit*. 1950, pp. 17, bibl. 49.

1076 DORASAMI, L. S., and SRINIVASA, G. **Acclimatisation of Egyptian cottons in Mysore.** *Indian Cott. Gr. Rev.* 1951, **5**, 1-13, bibl. 4. [Dept Agric., Mysore]

Trials with Egyptian cotton showed that it can be grown successfully in the Irwin Canal Tract, Mysore State, India. Of the varieties, Maarad, Sakel, Ashmouni, Giza 7 and Giza 12, the last two gave the highest yields. It was shown, in monthly sowing date trials, that the optimum sowing period for these cottons was Oct-Nov. The soil in the Tract is N deficient. In manurial trials (randomized plots with four replications) with three levels of NPK, highest yields were obtained from dressings of 100 lb. N + 25 lb. P_2O_5 per acre. It was found that boll ripening was retarded by topping young plants, but that higher yields were obtained when the cotton was topped in its 16th week of growth. —N.G.S.

1077 O'KELLY, J. F. **Registration of improved cotton varieties.** *Agron. J.* 1951, **43**, 241. [Mississippi Agric. Expt Sta., State College]

Fox (Reg. No. 39) originated from a cross between Deltapine 14 and Stoneville 2B. It is adapted to the more humid wilt-free areas where an early, rapid-fruiting cotton is required. The plants have short internodes, few vegetative branches (except where the plants are widely spaced), light foliage, moderate pubescence, bolls medium-small and slightly pointed, and a lint percentage of 36 to 38. On wilt-free soils Fox has compared extremely well with other varieties.—P.J.B.

1078 BOZA BARDUCCI, T. Sobre la eficiencia de los nuevos linajes de algodón Tangüis obtenidos en Perú y acerca de los métodos utilizados para producirlos. [**The efficiency of the new cotton variety " Tanguis " bred in Peru, and methods used in obtaining it.**] *Lilloa* 1949, **18**, 155-64, English summary p. 155. [Esta. Expt Agric. La Molina, Lima, Peru]

Tangüis, a Peruvian variety of *Gossypium barbadense* distinguished by resistance to wilt and by great productivity, is described. An account is given of the breeding material used and steps taken in effecting its improvement.—G.M.R.

1079 PIERIS, H. A. **Progress of cotton cultivation in the South-Eastern Division [of Ceylon] with special reference to the village cotton purchase scheme.** *Trop. Agriculturist* 1949, **105**, 117-23, illus. [Received 1951]

The cotton variety BP 79 was recommended for cultivation in the Buttala and Wellawaya districts of Uva Province and the Hambantota district of Southern Province, Ceylon.—N.G.S.

1080 RICHMOND, T. R., and LEWIS, C. F. **Evaluation of varietal mixtures of cotton.** *Agron. J.* 1951, **43**, 66-70, bibl. 6.

1081 RODRIGUES PEREIRA, J. Do aproveitamento industrial da semente do algodoeiro. [**On the industrial utilization of cotton seed.**] *Agron. Angolana* 1950, **4**, 121-30, English and French summaries p. 130.

The seed of the Angolan cotton variety Triumph Big Ball was analysed. The average oil content was 19.87 %.—N.G.S.

1082 QUINTANILHA, A., and others. O problema da escolha da semente para sementeira na cultura do algodão. [**The problem of seed choice in cotton growing.**] *Agron. lusit.* 1949, **11**, 191-222, English summary pp. 217-8, pl. 8, bibl. 26. [Cott. Res. Centre, Portugal]

Within less than 20 years, cotton has become a crop of fundamental importance in the economy of the Portuguese Colony of Mozambique. The mean yield per unit area is still very low. Several measures for increasing this are enumerated, and special attention is paid to the necessity for using not only a good variety, but also disinfected and physiologically well-developed seed. A biological study is presented of the damage done to seed by insect attack and bacterial and other infection. Sulphuric acid treatment is considered to be the only efficient means of eliminating seed of poor quality, and it is recommended for use when cotton is cultivated on a large scale. Increased production through H_2SO_4 treatment may range from 22 to 94 %.—G.M.R.

1083 BALLARD, W. W. **Varietal differences in susceptibility to thrips injury in upland cotton.** *Agron. J.* 1951, **43**, 37-44, bibl. 4. [Div. of Cotton and other Fibre Crops and Diseases U S Dept Agric., Beltsville, Md]

Cotton varietal tests have shown marked differences in the susceptibility of different varieties to thrips injury. In the trials reported, varieties having a rather dense pubescence of juvenile leaves subtending the terminal buds were most resistant to thrips, while varieties with sparsely pubescent or almost glabrous terminal growth were most susceptible. Of the varieties tested, Empire, Coker 100, Coker 100 Wilt and Collins Stoneville showed consistently high resistance to thrips, while HiBred and several Stoneville strains were highly susceptible. The young leaves of Empire were the most heavily pubescent of all the varieties and had the highest thrips resistance; HiBred had almost glabrous young leaves and was the most susceptible variety tested. Varieties of intermediate pubescence differed widely in susceptibility to thrips, a possible indication of the existence of factors other than pubescence, of importance in thrips resistance. A method of grading thrips injury to young plants which provides a basis for the calculation of a thrips injury index is described. The index is of value to breeders in the evaluation of breeding material and provides an apparently accurate method of differentiating the susceptibility of varieties to thrips.—P.J.B.

1084 RUSSO, G. Esperimenti di disinfestazione dei semi di cotone con acido cloridrico gassoso secco. [**Trials on cotton seed disinfestation with dry gaseous hydrochloric acid.**] *Ann. Fac. Agr. Univ. Pisa* 1946, **7**, 169-74, bibl. 1. [Received 1951]

RUSSO, G. Esperimenti di disinfestazione dei semi di cotone con anidride solforosa. [**Trials on cotton seed disinfestation with sulphur dioxide.**] *Ann. Fac. Agr. Univ. Pisa* 1946, **7**, 175-7. [Received 1951]

Dry gaseous hydrochloric acid and sulphur dioxide, employed at the doses necessary to destroy the larvae of *Platyedra gossypiella*, had a depressing effect on cotton seed germination.—E.B.

1085 EL SALVADOR, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Bol. Tec. No. 5. Problemas de control de insectos del algodón en El Salvador. [**Problems of insect control on cotton in El Salvador.**] By *E. J. Hambleton.* 1950, pp. 11.

Three mixtures of insecticides were used:—Toxaphene + sulphur (ratio 2 : 4); BHC + DDT + sulphur (3 : 5 : 40); and calcium arsenate + Paris green. Four early-morning dustings were carried out between August 12th and September 9th. Results given are incomplete, since the cotton had not been harvested when the circular was written. All three mixtures controlled *Anthonomus grandis*. Results on *Heliothis armigera* were inconclusive, due to the activity of parasites, which, however, appeared to be unaffected by the mixtures. The first two mixtures controlled *Aphis gossypii*, but the mixture of calcium arsenate and Paris green was ineffective. *Alabama argillacea* can be controlled by the treatments for *Anthonomus grandis* if the interval between treatments is not too long. *Tetranychus* spp., which is controlled by sulphur + Toxaphene, or BHC + DDT, breeds on the foliage of *Sida* sp., and control measures therefore include the eradication of this host. It is recommended that dustings with Toxaphene + sulphur, or with BHC + DDT + sulphur, should be given at intervals of 5-7 days until the insects are controlled.—N.G.S.

1086 Patel, R. M. **Control of the cotton semi-looper in Baroda state.** *Indian Cott. Gr. Rev.* 1951, **5**, 44-8, bibl. 1. [Dept Agric. Baroda]

Attacks of the cotton semi-looper (*Tarache notabilis*) can be avoided if sowing is delayed for about two weeks after the first monsoon rainfall.—N.G.S.

1087 Boza Barducci, T. Nota sobre las especies del género "*Gossypium*" cultivadas en Colombia. [**Notes on the species of *Gossypium* cultivated in Colombia.**] *Lilloa* 1949, **18**, 133-41, bibl. 2. [Received 1951] [Esta. Expt Agric. La Molina, Lima, Peru]

Colombia is an important centre of distribution of the species *Gossypium barbadense* and *G. hirsutum* var. *Marie Galante* which are found growing wild, semi-wild and cultivated over wide areas. These areas are mapped. The Colombian varieties are considered valuable material for breeding.—G.M.R.

1088 Kušnirenko, M. D. [**Adaptation of cotton to salinization of the soil during the growing period.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **77**, 337-40, bibl. 9.

Experiments conducted in 1949 indicated that cotton plants adapted to salinization are distinguished by the greater viscosity of their protoplasm. In the phase of budding and flowering, viscosity of the protoplasm declines. A. F. Klešnin (*Herb. Abstr.* 16 : 874) found that a reduction in heat resistance of the plants is directly dependent on the concentration of salt in the external medium. Data from the experiments under review confirm this conclusion and also establish that, in plants adapted to salinization, heat-resistance is higher than in plants which are depressed by salinity.—R.P.J.

1089 Ter-Avanesjan, D. V. [**The role of insects in the cross pollination of cotton.**] [Russian] *Doklady Vsesojuz. Akad. S-H Nauk.* 1950, **15**, 26-30, bibl. 6. [All-Union Inst. Crop Husb.]

Investigations were conducted with two cotton varieties, 0246 and Wine Sap. Lists of insects collected on the flowers in 1939 and 1940 showed that the numbers and species present vary with the season. *Apis melifera* and *Halictus 4-strigatus*, which were found on the flowers in 1939, were absent in 1940. *Halictus patellatus*, which was present in large numbers in 1940, occurred very rarely in 1939. The percentage of cross-pollination depends on the species composition of the insect fauna and not on the number of insects visiting the flowers.—R.P.J.

1090 Balls, W. L. **Below soil level.** *Emp. Cott. Gr. Rev.* 1951, **28**, 81-96.

An illustrated account is given of some underground observations made on roots of the cotton plant at Giza, Egypt, by the Cotton Research Board staff during the 1930's. After mentioning previous work on cotton root systems, the author gives records from one observation pit over seven years under the following heads : sunshine effect on the root, growth rates, water shortage in the subsoil, blue colouration from waterlogging, life and death of roots under waterlogging, calcite pseudomorphs of the root, red colouration on aeration, accelerated soil deterioration, and soil regeneration by washing.—K.L.

1091 Gulati, A. N. **Effect of fertilizers on fineness of cotton.** *Indian Cott. Gr. Rev.* 1951, **5**, 14-17, bibl. 2. [Tech. Lab., Matunga]

In experiments with the cotton variety Gaorani 12 F-2, it was found that dressings of N greater than 20 lb. per acre were detrimental to the fibre properties.—N.G.S.

1092 Welch, C. D., and Nelson, W. L. **Increasing cotton yields in North Carolina.** *Better Crops with Plant Food* 1951, **35**, 11-14, bibl. 3. [N. Carolina Univ. Agric. Expt Sta., Raleigh]

Recent research relating to the N fertilization of cotton is reviewed and practical information is given of the P, K, Ca and N requirements of the crop.—P.J.B.

1093 Arizona Agricultural Experiment Station. Bull. 234. **Cotton fertilization [manuring].** By *L. L. Brimhall*, and *W. T. McGeorge*. 1951, pp. 21.

FLAX

1094 Wallen, V. R., and Skolko, A. J. **A comparison of seed testing methods in relation to the stem-break and browning disease of flax, caused by *Polyspora lini* Laff.** *Canad. J. Bot.* 1951, **29**, 138-42, bibl. 4. [Bot. and Plant Path. Div., Sci. Serv., Dept Agric., Ottawa]

Comparisons were made of the effectiveness of 3 methods of testing flax seed for *Polyspora lini* infection. They were : (a) the Ulster method ; (b) the New Zealand method ; (c) the Ottawa method. Method (a) involves plating the seed on agar with no surface sterilization of the seed ; (b) entails washing the seed in running tap water and covering the seed with the agar medium ; (c) entails surface sterilization of the seed with 2 % chlorine solution and plating the seed on agar. In trials with these testing procedures widely differing results were obtained. Where the seed was not seriously contaminated superficially by saprophytic fungi, method (a) has proved satisfactory in practice.

Method (b) has not proved satisfactory. Method (c) will not give an indication of the degree of superficial infection, but will give an indication of deep-seated infection, and thus the practicability, or otherwise, of seed treatment. A suggested method of testing seed for *P. lini* infection includes a combination of certain features of methods (b) and (c) for the detection of deep-seated infection, and the examination of centrifuged seed washings for the detection of superficial infection.—P.J.B.

OIL CROPS

SESAME

1095 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 12. El ajonjoli y su cultivo. [**Sesame and its cultivation.**] By *J. M. Cano* and *M. Lopez.* 1950, pp. 3.

The varieties of sesame recommended for El Salvador are Venezuela 51 and Venezuela 52. The soil should be prepared by ploughing to a depth of 25 cm. at least one month before sowing, followed by disc harrowing. May and June are the best months for sowing. Venezuela 51 should be sown at a distance of 60 cm. between furrows, 10 cm. between plants; Venezuela 52 at 90 × 30 cm. Two thinnings are recommended, the first when the plant is in the four leaf stage, and the second when the plants are 18 cm. high. Venezuela 52 is ready for harvesting when the seed begins to dry and turns coffee-coloured, and Venezuela 51 when the seed turns a greenish-yellow.—N.G.S.

1096 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 9. Variedades de ajonjoli para El Salvador. [**Varieties of sesame for El Salvador.**] By *J. M. Cano.* 1950, pp. 3.

The varieties of sesame recommended are Venezuela 51 and Venezuela 52. It is noted that yields of sesame decrease above 600 m. a.s.l.—N.G.S.

LINSEED.

1097 La Chacra ¿ Sembrar tarde o temprano el lino ? [**Should linseed be sown early or late** ?] *La Chacra* 1951, **21**, No. 245, p. 13.

In experiments carried out with the linseed varieties Benvenuto Labrador, Buck 3, Entre Rios, Klein II, and Querandi M.A. during the three years 1946-9 at the Experimental Station of Colonia Mascias, [Argentina] it was found that the optimum sowing date was the first fortnight of June. All five varieties can be successfully grown on soils free from " marchitamiento " [a disease complex dominated by *Fusarium lini*]. Querandi M.A. should be grown in infested soils and Klein II in virgin soils, or after a long rotation.—N.G.S.

1098 McKnight, T. **Pasmo disease** [*Sphaerella linorum*] **of linseed.** *Qd agric. J.* 1951, **72**, 94-6.

A system of crop rotation, sowing linseed only once in every 3 or 4 years, and seed dusting with an organo-mercury compound at the rate of 3 oz. per bu. of linseed, are the only effective control measures known. Work is in progress to select and breed disease-resistant varieties.—K.L.

SAFFLOWER

1099 Nebraska Agricultural Experiment Station. Circ. 87 (revised). **Safflower production in the western part of the Northern Great Plains.** By *C. E. Claassen* and *A. Hoffman.* Lincoln, 1950, pp. 24.

A review is given of the yields, diseases, soil requirements, varieties, seed treatment, cultivation and harvesting of safflower (*Carthamus tinctorius*). —P.J.B.

SUNFLOWER

1100 Traversi, Blanca A. Estudio inicial sobre una enfermedad del girasol (*Helianthus annuus* L.) en Argentina. [**Preliminary study of a disease of *Helianthus annuus* in Argentina.**] *Lilloa* 1949, **21**, 271-8, pl. 7, bibl. in text, English summary p. 271. [Dir. Gen. Invest. Agríc., Argentina]

The disease described is a new one which is of considerable economic importance because of its wide diffusion in the sunflower-growing regions of Argentina and the fact that it can attack and destroy plants at any stage of their development, even when the head is ripe. Early cutting of the head is sometimes practised to avoid loss of seed. The disease is due to a virus, is very infectious and can be transmitted either by sap, seed, or the insects *Thrips tabaci*, *Myzus persicae* and *Trialeurodes vaporariorum*. High temperature (over 26° to 28°C.) and humidity accelerate the progress of the disease. The symptoms are described, an account of inoculation experiments is given and a large number of plants giving positive results is listed. The list includes many crop and some herbage plants.—G.M.R.

1101 Berti, H. Anomalias florales en girsaol cultivado en La Plata. [**Floral anomalies in the sunflower cultivated in La Plata** (**Argentina**).] *Rev. Fac. Agron. La Plata* 1950, **27**, 283-5, illus., summary only.

An abnormal volunteer sunflower variety Saratov, Selec. Pergamino, was observed at La Plata, Argentina, and its derivations from normal are described. It is concluded that agro-climatic conditions and ecological factors affect the capitula.—N.G.S.

1102 Crovetto, R. M. Monstruosidades en Compuestas. II. [**Monstrosities in Compositae. II.**] *Lilloa* 1948, **14**, 75-92, bibl. 29, pl. 2, English summary p. 75.

The article includes an account and figure of ascidium [cup] formation in the leaf of *Helianthus annuus*.—G.M.R.

1103 Heiser, C. B. **Study in the evolution of the sunflower species *Helianthus annuus* and *H. bolanderi*.** *Univ. Calif. Publ. Bot.* 1949, **23**, 157-208

1104 Ivahov, V. K. [**Manuring of *Helianthus annuus* with granulated superphosphate in pockets.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1951, **16**, 12-15.

On the average of the years 1949 and 1950 granulated superphosphate at the rate of 90 kg. per ha. drilled in with the sunflower seeds increased the seed yield by 1.3 centners (centner = 100 kg.) per ha. (the yield without fertilizer was 29.5 centners per ha). When this fertilizer was applied at the rate of 40 kg. per ha. in pockets alongside the seeds, it increased the seed yield by 4.6 centners per ha.—R.P.J.

RAPE

1105 Kress, — Zur Frage des Sommerraps-Anbaues. [**On growing summer rape.**] *Dtsch. Landw.* 1951, **2**, 22-4. [Gülzow-Güstrow, Mecklenburg, Germany]

Directions for growing a new variety of spring-sown rape (Gülzow) include information on trials made at the Rostock Agricultural Experiment Station in 1948-9 to test (a) the application of N, which showed that the yield of both fat and protein depended largely on adequate N supplies, and (b) to compare spring-sown rape with other oil plants. Trials at Gülzow in 1948-50 on different times of sowing summer rape showed that the optimal time was that at which oats are sown, a finding believed to be of general application.—G.M.R.

1106 Schaeffler, H. Düngewirkung der Jauche bei Winter- und Sommerraps (Körnerraps). [**The action of liquid manure on winter and summer rape (seed rape).**] *Z. Pflanzenb. PflSch.* 1950, **1**, 14-40, bibl. 27. [Landesanstalt für Pflanzenbau und Pflanzenschutz, München, Germany]

Though there have been many experiments on the effect of liquid manuring on cereals, root crops and forage plants, this is the first one recorded in Germany for rape. Increasing quantities of liquid manure were applied in one dressing, and the effect on growth and yield was compared with that of nitrogen-equivalent applications of ammonium sulphate. The quantity per ha. of nitrogen, potassium and phosphorus, applied to the soils by means of liquid manure with different volumes of the liquid and in different years, is tabulated. Summer rape was able to tolerate 400 hl./ha. of liquid manure and winter rape 600 hl./ha. without hindrance to development, but owing to the possible danger of an overdose of potassium from heavy liquid manuring not more than 200 to 250 hl./ha. is recommended in practice, any deficiencies in phosphorus and nitrogen being made up by mineral fertilizers. A top-dressing of liquid manure applied in spring (March or early April) produced, in summer rape, an equally good effect on growth and on yield of straw and seed as did equivalent nitrogen applications in the form of ammonium sulphate; in winter rape the resulting yields of straw were even higher. Liquid manure also had a beneficial effect when applied in May to winter rape and in June to summer rape. The effect of liquid manure was as rapid and as long lasting as that of mineral nitrogen fertilizers.—D.B.

OTHER

1107 Olsson, G. Oljedådra—en ny oljeväxt. [***Camelina sativa*—a new oil plant.**] *Lantm. Svenskt Land* 1951, **35**, 397-9.

In Sweden, autumn rape gives a higher yield of seed and of oil than spring-sown oil plants. Of the latter, spring rape has the highest specific yielding capacity but it is highly susceptible to insect attack. White mustard is relatively free from insect attack, but the oil content of its seed is low. *Camelina sativa* is comparatively free from attack by pests and ripens 12 to 13 days earlier than white mustard and spring rape. On the average of 36 trials conducted from 1947 to 1949, *C. sativa* had an oil content of 40.2 % and white mustard 29.3 % on a dry-weight basis. The oil content of *C. sativa* seed is approximately equal to that of spring rape. Seed of *C. sativa* should be sown at the rate of 6 kg. per ha. at a depth of 1 to 2 cm. When sown in drills 33 cm. apart, the yield was 9 % higher than with a drill spacing of 44 cm.—R.P.J.

GENERAL

1108 Collins, J. L. Productivité et oléagineux métropolitains. [**Productivity of oil crops in France.**] *Oléagineux* 1951, **6**, 15-19.

The area under oil crops in France, which was insignificant before the war, was 150,400 ha. in 1950, almost two-thirds of this area being under colza. The yield of seed per unit area and the oil content of the seed-oil crops as a whole have both increased in recent years.—E.B.

OTHER CROPS

1109 LABRIEGO, J. La cardencha. [**The teasel (in Argentina)**.] *La Chacra* 1951, **21**, No. 246, 44, illus.

Fuller's teasel, *Dipsacum fullonum*, is a biennial which grows in temperate climates with a minimum annual rainfall of 600 mm, and an optimum annual rainfall of 900-1000 mm. Humid climates are unsuitable for the production of teasels for carding. Teasels prosper under irrigations of 4 to 5 thousand cu. metres of water per ha. Excessive nitrogen produces weak teasels. Being an exhausting crop, sound rotations should be adopted, and the soil should be well prepared. Teasels are grown from seed—they may be either transplanted or sown direct. When transplanted, they should be sown early in spring and transplanted at the end of summer or the beginning of autumn. Otherwise, seed should be sown at the onset of spring (end of Sept.—beginning of Oct. in Buenos Aires), at a rate of 10-12 kg. per ha., in lines 50 cm. apart with 30 cm. between plants. Harvest is in the second year, in January (in Buenos Aires). The correct time to harvest is when the heads approach maturity and begin to turn red. A gang of 10 men can collect 600 kg. of heads in a 9 hr. day; a skilled worker can collect 7000—8000 heads daily. The yield of teasels is 1000-1500 kg. per ha. The cut heads should be dried completely in a sheltered place. Yield of seed is 300-400 kg. per ha., 1 hectolitre of seed weighing 35-45 kg. As only the central, or king, teasel head is fertile, it should not be cut if seed is required.—N.G.S.

1110 MARTINS, Antonieta Quintela. Contribução para o conhecimento de " *Hedychium coronarium* " Koen. (lírio do brejo). [**Contribution to a knowledge of *Hedychium coronarium* Koen.**] *Lilloa* 1948, **16**, 243-9, bibl. 10, pl. 2, English summary p. 243. [Brazil]

This paper was presented to the Second South American Botanical Congress, 1948. An account is given of the anatomy of the rhizomes of *Hedychium coronarium* and of the structure of the starch contained in them. The rhizomes are abundant and contain 84 % water, 6 % starch and 0.1 % essential oil. The plant, introduced from Asia for ornamental purposes, has now spread over wide areas of Brazil and often suppresses all indigenous vegetation. Its 2-metre high shoots have a high fibre content and are used for paper-making, especially in the state of Parana. Its starch is used in some places as arrowroot, which it closely resembles.—G.M.R.

LAND USE, SURVEYS AND MANAGEMENT

1111 DE FELLNER, C. **Some problems of Greek agriculture.** *World Crops* 1951, **3**, 211-14, illus.

Greece can be divided into two agricultural zones; a northern zone with an average temperature of 68°F, and a continental character, and a southern, Mediterranean zone. Both zones are characterized by much sunshine. Only 22 % of Greece is under cultivation, large areas being rocky, mountain waste-land of poor grazing value. The cereals are the chief crops, of which wheat is the most important. The total area of leguminous and forage crops grown in rotation with cereals is very small (only 11 % of the cultivated areas being devoted to legumes and pasturage). As a result, soil fertility is tending to decline. This is accentuated by the lack of live stock. Rice production is on the increase. More cotton is being grown, and may prove to be a possible alternative crop for including in the crop rotation. Improved soil conservation, and efficient crop rotations are required. It is considered that increasing the cultivation of leguminous crops would be the quickest method of improving soil fertility, that new forage crops are needed, and that the introduction of fibre crops would be of value.—N.G.S.

1112 WHITMORE, J. S. **The Towoomba Agricultural Research Station.** *Fmg S. Afr.* 1951, **26**, 135-40.

This is the first of a series of articles in which the climatic controls of the major areas in South Africa served by the agricultural colleges and research stations of the Union Department of Agriculture will be discussed. The study of the distribution, intensity and variability of the climatic elements will provide a means for assessing the long-term chances of success of different farming enterprises for the areas studied. Climatic analysis demonstrates that the area of the Springbok flats served by the Towoomba Agricultural Research Station is sub-tropical, with a relatively low and unreliable rainfall which restricts the cultivation of annual crops. The area is unsuited to the cultivation of maize. The greatest chance of success lies in drought-resistant, early-maturing crops which can utilize effectively the heavy rain of midsummer, which amounts to 50 % of the annual rainfall. While the production of cash crops is precarious, conditions favour good fodder-crop yields, sufficient in many seasons to provide adequate reserves for use in years of scarcity.—K.L.

FARMING SYSTEMS AND PRACTICES

1113 Harwood, L. W. **Observations on indigenous systems of agriculture** [**in Fiji**]. *Agric. J. Fiji* 1950, **21**, 3-9, bibl. 7.

This is a description of the pre-Christian agricultural calendar of the Fijians, which was based mainly on yam (mainly *Dioscorea alata*) cultivation. Methods of soil conservation included: a realization of the need for bush-fallow after cultivations, a method of planting food crops on the triangle to minimize soil movement, and terrace construction. Mulching was appreciated. Traditionally, the farming system was one of shifting cultivation and polyculture, but it also included a definite cropping programme suited to the conditions then existing. Similar systems of shifting cultivation in the Pacific area are reviewed, as is also the ' corridor system ' in the Belgian Congo.—N.G.S.

1114 de Rosayro, R. A. **Some aspects of shifting cultivation in Ceylon.** *Trop. Agriculturist* 1949, **105**, 51-8, bibl. 13, illus. [Received 1951]

Chena, or shifting cultivation, is considered with reference to re-afforestation. The ecological succession from abandoned cultivated areas to forest is described. A map is given showing the distribution of the chief forests in which shifting cultivation occurs.—N.G.S.

1115 Paul, W. R. C. **Roving agriculture and the problem of dry farming** [**in Ceylon.**] *Trop. Agriculturist* 1949, **105**, 4-13, bibl. 7. [Received 1951]

1116 Balasubrahmanyan, R. **A note on the mixed cropping trials at Guntur.** *Indian Cott. Gr. Rev.* 1950, **4**, 173-7.

The cotton varieties 881F and 197-3 when grown mixed with groundnuts in the proportion of 1 : 8 gave higher cash returns than groundnuts alone. Similarly, G1 cotton when grown mixed with chillies in the proportion of 1 : 14, proved more remunerative than a pure stand of chillies.—From author's abstract.

1117 Nebraska Agricultural Experiment Station. Bull. 393. **Systems of farming for the Tri-County irrigation area in Nebraska.** By *T. S. Thorfinnson* and *A. W. Epp*. Lincoln, 1949, pp. 52.

1118 de Wall, P. E. **Irrigation farming along the Orange River.** *Fmg S. Afr.* 1951, **26**, 92-4. [Natal Agric. Res. Sta., Pietermaritzburg]

1119 Kansas Agricultural Experiment Station. Circ. 268. **Practices and costs on wheat farms in Western Kansas, 1947.** By *O. J. Scoville* and *J. A. Hodges*. 1950, pp. 27.

1120 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. No. 34. Rotación de cultivos. [**Rotation of crops.**] By *M. Chàvez Viaud*, 1951, pp. 3.

1121 Roemer, T. Die Erzeugung von pflanzlichem Nahrungseiweiss. [**The production of plant protein.**] *Kühn-Arch.* 1950, **63**, 91-101. [Univ. Halle, Saale, Germany]

Depleted soil fertility due to continuous intensive cropping makes it urgent that the proportion of legumes grown in Germany should be increased. The possibilities of doing this are discussed, with special reference to the growing of peas, lupins and soyabeans. Problems of utilization and nutritional value are also discussed.—G.M.R.

1122 El Salvador, Ministerio de Agricultura y Ganaderia, Centro Nacional de Agronomia. Circ. Agric. No. 23. Mejore sus suelos sembrando leguminosas. [**Improve your soils by sowing legumes.**] By *J. M. Watkins* and *J. M. Cano*. 1950, pp. 3.

The following legumes are recommended as green manures for El Salvador:—*Cajanus cajan*, *Vigna sinensis*, *Canavalia ensiformis*, *Rhynchosia phaseoloides*, *Dolichos lablab*, *Stizolobium deeringianum*. Seed rates for growing for seed and for green manures are given.—N.G.S.

1123 Netherlands, Ministerie van Landbouw, Afdeling Akker- en Weidebouw. Werkkalender voor de Landbouw. Het weer en de werkzaamheden in akkerbouw, weidebouw en veehouderij van maand tot maand. [**Agricultural work-calendar. The weather and work from month to month in arable, grassland and live-stock farming** (**in Holland**).] 1950, pp. 88.

SOIL AND WATER CONSERVATION

1124 Netherlands, Ministry of Agriculture. Department of Crops and Pastures. Med. No. 1. Stuivende gronden in Nederland. [**Blowing soils in the Netherlands.**] By *R. P. H. Miedma*. pp. 24, bibl. 7.

Soil-blowing is an increasingly serious danger on the light sandy soils of Holland, particularly in north Limburg. Methods of controlling such wind erosion are detailed. These include increasing the organic matter content of the soil by applying farmyard manure and compost, ploughing in green crops such as lupin, serradella and red clover, the use of suitable crop rotations and the establishing of wind-breaks.—P.J.B.

1125 Coimbra Filho, A. F. O gênero *Neomarica* no combate à erosão. [**The genus *Neomarica* in the fight against erosion.**] *Rodriguésia* 1949, **11**, 189-96, bibl. 1 in text, illus.

Neomarica northiana is recommended as an excellent plant for combating erosion in Brazil. It is of extremely rapid growth, and will flourish on the edges of woods and forests where other anti-erosion plants suffer from lack of light. It is not subject to disease, it can survive prolonged drought and its rhizomes are rich in food reserves. *N. northiana* is a particularly valuable counter to mechanical erosion caused by water. The leaves form an erect fan in one plane. The plant flowers from September-November. It should be planted on rainy days, in such a way that plants in each row are opposite the gaps between the plants in the row immediately above, with the plane of the leaves perpendicular to the slope. Spacing depends upon the steepness of slope ; the greater the slope, the closer should be the spacing, but 30 cm. × 30 cm. is recommended as a basic spacing.—N.G.S.

WEEDS AND WEED CONTROL

1126 Utah Agricultural Experiment Station. Circ. 127. **Weeds. Methods for their control and eradication.** By *D. C. Tingey* and *F. L. Timmons*. [n.d.], pp. 47.

A comprehensive review is given of methods that include the use of cultivation practices and herbicidal chemicals for the control of weeds under Utah conditions. A tabulated summary is given of methods of controlling weeds in different crops, on lawns and on untillable land, such as ditch banks, fence lines, etc., and the control of water weeds in irrigation ditches. A tabulated summary is also given of the life period, method of reproduction and reaction to 2,4-D of a large number of weeds found in Utah.—P.J.B.

1127 **Washington,** Food and Agriculture Organization of the United Nations. FAO Agric. Studies No. 13. **Weed control by growth-regulating substances.** By *L. Ling*. 1951, pp. 36.

This publication summarizes the salient points of the literature on the subject of hormone weed killers and is intended to provide a convenient guide for the use of these substances. The weed killers reviewed are 2,4-D, MCPA, 2,4,5-T, TCA and IPC.—P.J.B.

1128 Carter, E. P. ***Acanthospermum hispidum*, a noxious weed in Georgia.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 23-5. [Mimeographed] [Georgia Agric. Expt Sta., Athens]

Acanthospermum hispidum is a native of South America which has become established as a noxious weed in many parts of Africa and in Queensland, Australia. A wide potential distribution for this weed in the USA was indicated by greenhouse experiments, in which the weed grew well on both light and heavy soils and under the conditions of winter day-length found as far north as Washington. There are indications that this weed is capable of surviving at latitudes considerably north of those in which it is now found. Conflicting reports have been received of the efficacy of 2,4-D in controlling the weed.—P.J.B.

1129 Ottawa Central Experimental Farm, Division of Illustration Stations. **Couch grass control studies.** *Ottawa Cent. Expt Fm, Illus. Sta. Div.*, Progress Report 1938-1947, p. 25. [Received 1950]

In eastern Canada, effective control of couch grass (*Agropyron repens*) has been obtained by after-harvest cultivation during the year prior to seeding the land to root crops. The land is shallow-ploughed early in August after the hay crop is removed, the furrow being turned over flat and then rolled for consolidation. The land is then left for 10 days to allow the sod to decompose. Subsequent shallow cultivations are then carried out to eradicate green growth. Hot, dry weather is essential to the success of these preliminary cultivations. The land is then given a second and deeper ploughing in autumn prior to the freeze-up. In western Canada, summer fallowing has been the best means of controlling couch grass, but in all regions, the value of proper tillage, combined with the maintenance of soil fertility and the establishment of vigorous hay and pasture swards, has been demonstrated as a means for keeping weeds, especially couch grass, out of clean land.—P.J.B.

1130 CIFERRI, R., and BERTOSSI, F. Efficacia inibitoria dell'O-isopropil-N-fenil carbamato sullo sviluppo del *Cynodon dactylon*. [**Inhibitory effect of O-isopropyl-N-phenyl carbamate on the development of *Cynodon dactylon*.**] *Atti Ist. bot. Univ. Pavia* Ser. 5, 1950, **8**, 125-7, bibl. 4, English summary p. 127.

In preliminary trials rhizomes with leaves of *C. dactylon*, sometimes a troublesome weed of crops, were treated with O-isopropyl-N-phenyl carbamate (IPPC). The following observations were made : (a) if the stem and leaves of *C. dactylon* were immersed rapidly in aqueous solutions of IPPC at different concentrations and then grown in soil, a complete inhibitory effect was obtained from solutions containing 2000 to 1000 ppm of IPPC, a strong effect from solutions of 500 to 250 ppm, and a small effect from solutions of 125 ppm ; (b) if the plants were grown in nutrient solutions containing IPPC, there was a complete inhibitory effect from solutions of 62.5 ppm, a strong effect from 15.6 ppm, while the effect was negligible at lower concentrations ; (c) if the plants were grown in pots which were watered with solutions of IPPC, there was a strong inhibitory effect from a dose of 0.04 grm. of IPPC per kg. of soil, and a moderate effect from doses of 0.02 to 0.01 grm.—E.B.

1131 BARTON, Lela V., and HOTCHKISS, Janet F. **Germination of seeds of *Eichhornia crassipes* Solms** [**water hyacinth**]. *Contr. Boyce Thompson Inst.* 1951, **16**, 215-20, bibl. 4.

Under conditions of darkness, there was no germination over a 14-week period of either moist or fresh seed kept at constant temperatures in the range 10 to 40°C., or at alternating temperatures of 15 to 30, 15 to 35, or 15 to 40°C. A few seedlings were produced at alternating temperatures of 5 to 30 and 5 to 35°C. Three lots of seeds (a) full-size, dark-brown, (b) full-size, light-brown, (c) dark-cream or light-tan seeds of less than full-size, kept at alternating temperatures of 5 and 40°C., had germination percentages of 62, 48 and 15, respectively. Lots (a), (b) and (c), kept at greenhouse temperatures (range 23 to 59°C) in sunlight, had germination percentages of 95, 98 and 46, respectively. Following storage in water for 17 months at 20, or 30°C., the seed became less dormant and germinated over a wider range of temperatures than fresh seed. Such seed germinated in fluctuating air or water temperatures as low as 22°C., in the sunlight ; these temperatures were well below those at which seed germinated in darkness. Storage temperatures of 20 and 30°C., were better than either lower or higher temperatures in maintaining the viability of seed stored in water for 6 months, or longer. The speed of germination of all seed lots was enhanced by storage for one month, or longer, to permit of after-ripening, particularly in the case of the somewhat immature seed of lot (c). It was concluded that a combination of high temperature and light is needed for the complete germination of dormant seed.—P.J.B.

1132 EVERIST, S. L. **Hoary cress—declared a noxious weed** [**in Queensland**]. *Qd agric. J.* 1951, **72**, 19-21.

Hoary cress (*Lepidium draba*), is a serious weed of wheat fields. If eaten by dairy cows it will taint their milk. Its eradication is difficult because of its extensive underground roots, but the plant can be killed by spraying with hormone weed killers [names not specified] at the rate of 2 lb. active ingredient per ac. Several applications may be needed to destroy the plant.—K.L.

1133 LEONARD, O. A., and others. **The control of Johnson grass in soybeans with LHH-1.** *Proc. 3rd. Southern Weed Conf.* 1950, p. 49. [Mimeographed] [Mississippi Agric. Expt Sta., State College]

Applications of LHH-1 (naphtha oil) at a rate of 2.5 gal. per ac. were made on May 6 to soyabeans 6 in. high. Slight burning of the soyabean hypocotyls resulted ; almost all the crabrass (*Digitaria* spp.) seedlings present were killed but nutgrass (*Cyperus rotundus*) remained unaffected. On June 2, further applications of 7 gal. per ac. of naphtha oil were made to the plots previously treated, while other plots previously treated were hand-hoed. The yields of soyabeans per 90 ft. row on the naphtha-treated, hand-hoed and untreated control plots, were 11.75, 11.75 and 9.50 lb., while the numbers of Johnson grass (*Sorghum halepense*) stems per 90 ft. row were 40, 24 and 400, respectively.—P.J.B.

1134 PORTER, W. K., and TALLEY, P. J. **Spotting agents for Johnson grass control.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 42-5. [Mimeographed] [Delta Branch Expt Sta., Stoneville, Miss.]

The results of trials with a number of herbicides indicated that a more satisfactory and economic control of small areas of established Johnson grass (*Sorghum halepense*) could be obtained by the use of sodium chlorate and TCA applied to the soil surface early in the season, rather than to the vegetation later in the season.—P.J.B.

1135 COWART, L. E., and RYKER, T. C. **Studies on the control of nutgrass (*Cyperus rotundus*).** *Proc. 3rd Southern Weed Conf.* 1950, pp. 135-9, bibl. 4. [Mimeographed] [Louisiana Agric. Expt Sta., Baton Rouge]

Trials were carried out on the control of nutgrass by means of repeated applications of 218 lb. per ac. of sodium TCA and 2 lb. per ac. of 2,4-D amine salt. Both these herbicides caused rapid kills of the tops and a proportion of the basal nuts, but did not result in reductions in the number of nuts in the soil. Applications of a mixture of 2 lb. of 2,4-D amine salt and 164 and 218 lb. per ac. of sodium TCA did not give significantly better control than either herbicide used alone.—P.J.B.

1136 LEONARD, O. A., and HARRIS, V. C. **Nutgrass control with methyl bromide.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 132-4. [Mimeographed] [Mississippi Agric. Expt Sta., State College]

Applications of 1, 2 and 4 lb. of methyl bromide per 100 sq. ft. were made to loose and compact soil covered with vapour-proof Sisalkraft paper in winter, spring, summer and autumn. Mean soil temperatures were 49, 85 and 60-70 °F. for the winter, summer and autumn trials, respectively. [Soil temperatures are not given for the spring trials.] Nutgrass (*Cyperus rotundus*) tuber mortality was 100 % for the 1, 2 and 4 lb. per ac. applications on the loose soil. On the compact soil, results were unsatisfactory. 48 hr. covering was more effective than 24 hr. covering. On sandy loam soil, covered with a dense stand of nutgrass and crowfoot grass (*Dactyloctenium aegyptium*), where the soil temperature was 85 to 90°F. and the Sisalkraft cover was kept on for 48 hr., complete control of nutgrass was obtained both on loose and compact soil. Where there were holes in the cover, poor control was obtained.—P.J.B.

1137 NATION, H. A. **Two chemicals appear promising for control of palmettos.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 172-4. [Mimeographed] [Dow Chemical Company, Auburn, Ala]

Saw palmetto (*Serrenoa repens*) causes a serious weed problem in Florida and most of the eastern seaboard of the USA. In trials at Tifton, applications of TCA at a rate of 65 lb. per ac. of a 90 % product and 2,4,5-T ester at a rate of 4 to 5 lb. of acid equivalent per 100 gal. of water, gave complete control of palmetto.—P.J.B.

1138 DOWN TO EARTH. **The control of quack grass.** *Down to Earth* 1951, **7**, 10-11.

The results of a number of trials by different workers using sodium TCA for the control of quack grass (*Agropyron repens*) are briefly reported. A number of practical recommendations deduced from these and other trials are given and includ the following : areas infested with *A. repens* shoul be first ploughed and the upturned sod spraye with TCA ; for patches of *A. repens* in fields, th patches should first be sprayed before ploughin the entire field 3 to 4 weeks later. The most effec tive rate of application of TCA is 40 to 50 lb. pe ac. For the most effective control, a moderat amount of moisture should be present in the soil For the treatment of land that cannot be ploughed 80 to 100 lb. per ac. of TCA should be applied.—P.J.B.

1139 VALLANCE, K. B. **Studies on the germinatio of the seeds of *Striga hermonthica*. III. O the nature of pretreatment and after-ripening.** *Ann. Bot., Lond.* N.S. 1951, **15**, 109-28 bibl. 15. [Hartley Bot. Labs., Univ. Liverpool]

An attempt has been made to elucidate some of the changes which take place in seeds of *Striga hermonthica* (immature, ripe and over-ripe), (a) during moisture treatment at three temperatures (15°C., 22°C., and 32°C.), and (b) during after-ripening in dry storage. Observations on the drift of respiration of immature seed throughout pretreatment at 15°C. show that an inverse relationship exists between germination and respirational activity. This suggests that germination depends on the accumulation of some metabolite during pretreatment. It would seem that this metabolite may also be used as a substrate for respiration during pretreatment. After-ripening of the immature seeds has been shown to change the nature of the seeds in some way so that their peak respiration on exposure to moisture is at first progressively reduced. This reduction has been ascribed to the presence of some barrier capable of restricting gaseous diffusion. The data presented, together with those of the previous paper of this series, suggest that the specific metabolite required for germination might be proteinaceous. Certain other data appear to rule out the suggestion that germination capacity is conditioned by the sugar content of the seeds. Reasons are given which support the view that one of the main effects of the stimulating solution on the seed is to increase the permeability of the seeds to gaseous diffusion.—Author's abstract.

1140 ALBERTA Department of Agriculture. **The control of toad flax in Alberta.** By *G. R. Sterling*. [n.d.], pp. 3.

1141 CROVETTO, R. M., and PICCININI, B. G. Bibliografía argentina sobre malezas. [**Argentinian bibliography of research on weeds.**] *Lilloa* 1949, **18**, 211-12. [Received 1951] [Dir. Gen. Laboratorios and Investigaciones, Argentina]

The authors have compiled a list of 695 references to the literature on the weeds of Argentina, which, however, is not given.—G.M.R.

1142 LEONARD, O. A., and HARRIS, V. C. **The effect of certain hydrocarbon compounds upon the hypocotyls of cotton and soybeans and upon the shoots of nutgrass [*Cyperus rotundus*] and Johnson grass [*Sorghum halepense*].** *Proc. 3rd Southern Weed Conf.* 1950, pp. 91-101. [Mimeographed]

1143 WARREN, G. F. **Crop reactions to pre-emergence herbicides.** *Proc. 5th North-eastern Weed Control Conf.* (*Supplement*) 1951, pp. 41-5, bibl. 8. [Mimeographed]

1144 DAVIS, N. P., and others. **Pre-emergence tests on cotton.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 61-7. [Mimeographed] [Delta Branch Agric. Expt Sta., Stoneville, Miss.]

The results from trials in which 66 herbicidal materials were used as pre-emergence sprays for the control of weeds in cotton were inconclusive, in that none of the materials gave satisfactory results in terms of weed control, economy and lack of damage to the cotton. It is held that these results do not exclude the possibility of successful results with pre-emergence treatments under certain conditions, or in conjunction with other types of mechanical and chemical weed control. The need for better pre-emergence weed control materials and a better understanding of the possibilities and limitations of the present materials and techniques, is stressed.—P.J.B.

1145 TALLEY, P. J., and others. **Post emergence [weed] control studies with cotton.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 78-90. [Mimeographed] [Delta Branch Agric. Expt Sta., Stoneville, Miss.]

Trials were carried out to determine the characteristics and adaptation of a large number of hydrocarbon compounds used for weed control in cotton. Among the petroleum compounds, LHH1, LHH1-ox, Hexane and Varsol B were the most effective. Among naphtha fractions, Lion (24 % aromatic oil content), Esso (35 % aromatics), and Shell (16% aromatics) were the most effective. Data are given of the performance of these compounds. The 24 % aromatic oil gave as good weed control as the 32 % aromatic oil, but caused less injury to the cotton; the 16 % aromatic oil gave less satisfactory weed control than the other two. In further trials, the relative effectiveness of the following treatments was studied: pre-emergence spraying with 6 lb. per ac. of dinitro compound [type not specified], post-emergence oil spray at 5 gal. per ac. [type not specified], rotary hoeing when the cotton was young, and flaming later in the season. The highest yields followed the use of a combination of all treatments, though there were no significant differences in yields where both pre- and post-emergence treatments were made, regardless of whether, or not, rotary hoeing and flaming was carried out. None of the treatments in this trial caused any injury to the cotton. In trials to evaluate more fully the advantages of pre-emergence treatment, followed by post-emergence treatment, thirteen different pre-emergence spray treatments were made in which LHH1 and LHH7 oils were used as carriers for Sinox G, Sinox W, Dow G and Penta dinitro compounds. Very good weed control was obtained with post-emergence treatment, following pre-emergence treatment, where the post-emergence treatment was made before the 14th day after emergence.—P.J.B.

1146 COWART, L. E., and others. **Studies on the control of annual weeds in cotton.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 70-7, bibl. 8. [Mimeographed] [Louisiana Agric. Expt Sta., Baton Rouge]

Four different commercially-available dinitro materials were applied at rates of 4, 6 and 8 lb. per ac. on plots at St. Joseph and Baton Rouge. The soil at St. Joseph contained 13.8 % soil moisture at the time of treatment, while that at Baton Rouge contained 4.9 %. All the dinitro compounds applied at rates of 6 and 8 lb. per ac. gave good weed control for 4 to 6 weeks on the St. Joseph soil and caused no damage to the cotton. On the Baton Rouge soil, the 6 and 8 lb. per ac. rates of application resulted in severe injury to cotton; the 4 lb. per ac. rate gave good weed control and resulted in much less severe injury to the cotton. In all cases where stunting was the only injury caused to the cotton, complete recovery took place within 12 weeks. Smooth, firm seed-beds were essential for satisfactory weed control with pre-emergence sprays. Three aromatic oils, Lion oil LHH1, Shell 170 and Esso Process oil 2105, applied as directed sprays at 60, 30 and 30 gal. per ac., respectively, gave good weed control. Process oil 2105 and Shell 170 caused some girdling of the cotton. Results from these oils indicated that the most satisfactory weed control was obtained by spraying when the weeds were 1 to 2 in. high. The possibilities of combining pre-emergence dinitro sprays with post-emergence oil sprays are discussed.—P.J.B.

1147 TALLEY, P. J. **A proposed method for the control of weeds and grass in cotton.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 103-13 [Mimeographed] [Delta Branch, Expt Sta., Stoneville, Miss.]

The proposed method involves the application of naphtha oils with an aromatic oil content of 23 to 25 % and a boiling range of approx. 300 to 400°F., as sprays directed to the soil and basal stems of the plants. Among the practical aspects of their use, the following are reviewed: method of land preparation and cotton sowing; the rate of application; frequency and number of applications; the susceptibility of different types of weeds to control by oil herbicides; the hazards and precautions in the use of oils; a general schedule of treatment. Naphtha oils have given excellent control of *Cyperus rotundus*, *Digitaria* spp., *Brachiaria* spp., and *Amaranthus retroflexus*. Among weeds not controlled by naphtha oils are: established perennial grasses such as *Cynodon dactylon* and *Sorghum halepense*, *Solanum* spp., *Xanthium americanum*, *Portula oleracea*, *Asclepias syriaca*, teaweed and perennial broad-leaf vines.—P.J.B.

1148 HARRIS, V. C., and others. **Preliminary study on the effect of ammonium dinitro-secondary-butyl phenate on hill-dropped and drilled cotton.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 68-9.

Trial results indicated that the "hill-dropping" of cotton seed gave much greater protection (in terms of percentage cotton stands) from applications of up to 8 lb. per ac. of ammonium dinitro-secondary-butyl phenate applied in 14 in. bands on the cotton rows, than did drilling the seed. Where 4, or more, lb. per ac. of dinitro was applied, the bands remained free of weeds until the autumn frosts set in.—P.J.B.

1149 ROBERTS, H. A., and BLACKMAN, G. E. **Studies in selective weed control. III. The control of annual weeds in leguminous crops with 2 : 4-dinitro-6-secondary-butyl-phenol.** *J. agric. Sci.* 1950, **40**, 263-74, bibl. 21.

Field and pot experiments were carried out to assess the herbicidal properties of 2 : 4-dinitro-6-secondary-butyl-phenol, and to determine its value for selective weed control in leguminous crops. Results from thirteen species of annual weeds showed that there was wide variation in the concentration required to produce a standard kill. Irrespective of the species, susceptibility was greatest in the young seedling stage. In lucerne and peas, resistance of the crop to the herbicide was linked with stage of development, and consequently there was an optimum stage of development and concentration when the elimination of weeds lead to maximum increases in yield. The ammonium salt of 2 : 4-dinitro-6-secondary-butyl-phenol, was found to be more toxic than the parent compound. From these experiments it appears that the use of dinitro-butyl-phenol or its ammonium salt could be extended to cover selective weed control in undersown cereal crops, cereal/legume mixtures and some of the more resistant legumes, such as autumn-sown field beans.—From authors' summary.

1150 ALTONA, R. E., and MENTZ, N. J. **The control of weeds in maize with selective plant-growth regulators. Second report 1949-50 season.** *Emp. J. Exp. Agric.* 1951, **19**, 26-32, bibl. 8.

For preliminary report see *Fld Crop Abstr.* 4 : 219. This second report is of work carried out in the Transvaal and Orange Free State Province of the Union of South Africa. In the Transvaal the sodium salt of DCPA (2,4-D) was tested as a pre-emergence spray, with and without cultivations, using a clean cultivation treatment as a control. The results showed that spraying plus one cultivation produced the same grain yield as the control. The yield of grain from spraying without cultivation was significantly lower than with cultivation. Solutions of different concentrations resulted in the same degree of weed control without affecting the maize plants. In the Orange Free State, the ethyl ester, sodium and amine salts of DCPA were applied as pre-emergence sprays, with and without cultivations. The ester was the only compound to cause damage to the young maize plants, and it took the form of leaf-roll. The amine salt gave the best results, with no significant difference between the ester and sodium salt. Herbicide plus cultivations were better than herbicide alone. Untreated plots given the same number of cultivations as treated plots yielded less than the treated plots.—From authors' abstract.

1151 GODOY, E. F. Ensayo de control de malezas en maiz por medio de herbicidas hormonales. [**Maize weed-control trial with hormone herbicides.**] *Argentina. Memoria de la quinta reunion de maiz* 1950, 194-5D, bibl. in text. [Esta. Exptl Pergamino, Argentina]

The effects of Metoxone, at rates of 500, 750, 1000, and 1500 cc. per ha. and Weed-no-more at rates of 5, 6, 7 and 9.5 l. per ha. on *Amaranthus hybridus* var. *quitensis*, *Chenopodium zobelii*, *Tagetes minuta* and *Datura ferox*, which are four common weeds of maize in Argentina, were studied. *Amaranthus hybridus* var. *quitensis* was moderately susceptible to both herbicides. *Chenopodium zobelii* was very susceptible. *Tagetes minuta* was semi-resistant, but good control can be obtained if the weed is sprayed while young. *Datura ferox* was semi-resistant, and although the maximum doses would not kill it, application of the herbicides while in the young state should prevent the seed from setting. The advantages of combining hand-weeding with herbicidal treatments were demonstrated. The maize plants were not affected if sprayed when 25-30 in. high, but two months after such treatment callouses on the root and proliferous adventitious roots were observed.—N.G.S.

1152 SHEAR, G. M., and others. **Results of 1949 weed control tests in corn [maize] with**

2,4-D. *Proc. 3rd Southern Weed Conf.* 1950, pp. 146-9. [Mimeographed] [Virginia Agric. Expt Sta., Blacksburg]

In weed control trials with 2,4-D amine salt at 4 locations in Virginia, applications [rate not specified] made immediately after sowing, or at a rate of 2 lb. per ac. of 2,4-D acid equivalent, after seedling emergence, resulted in growth retardation and significant reductions in yield, compared to applications made 4 to 8 days after sowing. Highest grain yields followed pre-emergence spraying at a rate of 1 to 1.5 lb. of 2,4-D acid equivalent in 10 gal. of water per ac., 4 to 8 days after sowing. —P.J.B.

1153 BAYLOR, J. E., and GOULD, C. S. **Observations from several field scale trials of calcium cyanamide for pre-emergence weed control in corn [maize].** *Proc. 5th Northeastern Weed Control Conf.* (*Supplement*) 1951, pp. 111-14, [Mimeographed] [Rutgers Univ., New Brunswick, N.J.]

From the results of 3-years' trials with granular calcium cyanamide for weed control in maize at New Brunswick, N.J., it was concluded that the application of 400 lb. per ac. as a pre-emergence treatment 4 to 5 days after sowing, gave effective weed control and could save at least one cultivation. The best results with cyanamide in terms of weed control and grain yield increases, were obtained on light soils. Cyanamide applied just before, or just after, heavy rain, gave poor weed control and where 600 lb. per ac. was applied under these conditions, caused damage to the maize.—P.J.B.

1154 KING, L. J., and KRAMER, J. A. **Some new polyethylene glycol diesters.** *Proc. 5th Northeastern Weed Control Conf.* 1951, pp. 31-4. [Mimeographed] [Boyce Thompson Inst., Yonkers, N.Y.]

In field trials with maize, pre-emergence applications of 1 lb. per ac. each of the low volatility polyethylene glycol 200 2,4-D diester, and 2,4-D amine salt, gave the same degree of control of broad-leaved weeds. Equivalent applications of the 2,4-D diester made 7 days after the sowing of maize gave better control of grassy weeds than did the 2,4-D.—P.J.B.

1155 BOWMAN, D. H., and TALLEY, P. J. **Weed control studies in small grain and corn [maize].** *Proc. 3rd Southern Weed Conf.* 1950, pp. 141-5. [Mimeographed] [Delta Branch Agric. Expt Sta., Stoneville, Miss.]

Applications of the triethanolamine salt of 2,4-D were made to wheat at rates of 0.5, 0.75 and 1 lb. per ac. of 2,4-D acid equivalent, on March 3rd and 21st. Good control of docks (*Rumex* sp.) wild winter pea (*Pisum sativum*) and vetch (*Vicia* spp.) followed the March 3rd treatments, but the March 21st treatments gave unsatisfactory results. The addition of Dreft at a rate of 0.5 oz. per 5 gal. of herbicide solution was effective only in the case of docks. A split application of 0.5 lb. of 2,4-D per ac. on March 3rd and 21st gave no better weed control than the single 0.5 lb. per ac. treatment on March 3rd. It is thought that if weather conditions had been more favourable, the split application would have been more effective. In no case was any damage noted in the wheat. Similar trials with oats and maize are reported in which grain yields were unaffected by the applications.—P.J.B.

1156 PIACCO, R. Il diserbo biochimico in risaia. [**Biochemical weeding in rice fields.**] *G. Agric. Domen.* 1951, **61**, 173.

The control of part of the weed population of rice fields in Italy by means of selective herbicides is briefly described. The preparations employed are Agroxone, Weedone, Erbitox, 2,4-D, Cerese, etc. which are sprayed on the crop in aqueous solution at the rate of 150 to 600 l. per ha., according to the type of spraying machine employed. The best machines for this purpose are, at present, horse-drawn. Treatment should be given during the first half of June. It is advisable to drain the field, at least partially, beforehand. The dose of herbicide varies from 400 to 800 grm. of active substance per ha. and varies with air temperature. It should be sufficiently strong to kill *Scirpus mucronatus*, the most noxious weed. [See also *Fld Crop Abstr.* 3 : 153.]—E.B.

1157 RYKER, T. C. **Grass control in rice.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 26-8. [Mimeographed] [Louisiana Agric. Expt Sta., Baton Rouge]

In trials with a number of herbicides for the control of *Echinochloa colona* in rice fields, sodium and ammonium trichloroacetate applied as post-emergence sprays at rates of 5 and 10 lb. per ac., when the rice was 1 to 2 in. high and the grass was just appearing, gave highly effective control of *E. colona*. The herbicide applications were made on June 21st, the fields being flooded on July 5th. The rice showed little effect from the TCA applications until flooding took place, when some plants died, the remainder becoming dark green in colour and showing some signs of dwarfing. The plants eventually recovered and grew normally.—P.J.B.

1158 CLARK, H. E., and FREIBERG, S. R. **Some effects of concentration of 2,4-D and pH of solution upon plant responses.** *Proc. 5th Northeastern Weed Control Conf.* 1951, pp. 19-27, bibl. 17. [Mimeographed] [New Jersey Agric. Expt Sta., Rutgers]

Experiments were carried out with soyabeans grown in nutrient solutions containing 2,4-D acid.

Results indicated that absorption of 2,4-D by the roots was followed by rapid systemic distribution of 2,4-D within the plant. Plants grown in solutions of pH 4 showed a more rapid response to 2,4-D than those grown in solutions of pH 7, apparently the result of the more rapid uptake of 2,4-D by roots grown in solutions of low pH. Very low concentrations of 2,4-D in solutions of pH 7 caused fasciation of the lower root laterals and stimulation of the upper laterals, higher concentrations killing the roots before such changes could take place.—P.J.B.

1159 Olson, P. J., and others. **Sensitivity of wheat and barley at different stages of growth to treatment with 2,4-D.** *Agron. J.* 1951, **43**, 77-83, bibl. 4. [Plant Sci. Div., Manitoba Univ., Winnipeg]

Investigations were carried out at Winnipeg, Brandon and Morden to determine the growth stages at which wheat and barley were most susceptible to 2,4-D injury. 2,4-D butyl ester was applied as a spray to wheat and barley at rates of 12 oz. (at Winnipeg) and 8 oz. (at Morden and Brandon) of 2,4-D acid equivalent per ac., at 3-day intervals starting from 3 days after sowing (4 days before emergence) to 18 days after heading. In the case of barley, there were two widely spaced periods during which the 2,4-D caused severe decreases in grain yield. The first was at the early seedling stage when the plants were 2 to 3.5 in. high, the second was from 4 days before, to 2 days after, heading in 1948, and from 6 days before, to 2 days before, heading in 1949. Both periods were well-defined. The grain yield reductions were most severe following spraying at, or just before, the heading stage. In 1949, significant grain yield reductions followed spraying at the above-mentioned growth stages only, but in 1949 at Winnipeg, data showed that at only 8 out of 23 dates of treatment, did the 2,4-D fail to produce significant yield reductions; namely, treatment at the 4, 7, 8, 10, and 16 in. high stages and at 3 of the 6 post-heading stages. At Brandon, spraying at the 16 in. high stage only, other than those stages already mentioned as being susceptible, resulted in significant grain yield reductions. With wheat, results were similar to those with barley. At Morden, the greatest yield reductions followed spraying during the 0.75 to 5 in. high stages. At Winnipeg, significant yield reductions followed spraying at the 5 in. stage, only. The later stage damage followed spraying at the same growth stage (16 and 17 in. high, at about 11 days before heading), at both Morden and Winnipeg. Unlike barley, 2,4-D damage to wheat was greater following spraying at the early growth stage, than at the later stage. At Morden, slight, but significant, yield reductions followed spraying at the 7, 8, 19, 22, 30, and 32 in. high stages. At Winnipeg, no significant yield reductions, other than those already detailed, were noted. In view of the difference between the results at Morden and Winnipeg, further trials are necessary to establish more precisely the stages at which wheat and barley are susceptible to 2,4-D.—P.J.B.

1160 Cyprus. Quarterly Review No. 24, 1st Jan.-31st March 1951. Nicosia 1951, p. 10.

Pentachlorophenol liquid concentrate killed the top growth of *Oxalis* sp., but did not appear to affect the roots. It was ineffective against charlock [*Brassica sinapis*] and *Malva* spp. in the advanced stage of growth. Sodium trichloroacetate killed *Oxalis* sp., charlock, *Malva* sp., wild oats and rye grass. Isopropyl-phenyl-carbonate proved ineffective against both monocotyledonous and dicotyledonous weeds. [Rates and concentrations used are not given for any of these three herbicides].—N.G.S.

1161 Schexnayder, C. A. **Comparative studies of certain amine salts of 2,4-D.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 4-6. [Mimeographed] [Louisiana Agric. Expt Sta., Baton Rouge]

The following 2,4-D salts were tested in the field on Johnson grass (*Sorghum halepense*), oats, rice, *Sonchus* spp., and Mexican weed (*Caperonia castaneaefolia*) in rice: (a) triethanolamine, (b) sodium, (c) triethylamine, (d) diethylamine, (e) monoisopropylamine, (f) a mixture of the ethylmonethanolamine and ethyldiethylanolamine salts, (g) a water-soluble mixture of 70 % diethylamine and 30 % triethylamine salts. In pre-emergence spray trials with Johnson grass, at a rate of application of 3 lb. per ac. of 2,4-D acid equivalent, (a) and (b) gave 82 % control, while (c), (d) and (e) gave 86, 85 and 85 % control, respectively. Treatments (f) and (g) gave a less satisfactory control of 78 and 79 %, respectively. With oats 4 in. high, damage to the crop occurred only when applications of more than 1 lb. per ac. of any of the herbicides tested, were made. Rice was sprayed with these herbicides when 3 weeks old and flooded one week later to determine the effectiveness of the herbicides against Mexican weed and their effect on rice. The rates of application for all the herbicides were 0.25, 0.5 and 0.75 lb. per ac. of 2,4-D acid equivalent. All the herbicides at the 0.5 and 0.75 lb. per ac. rates gave complete control of Mexican weed. At the 0.25 lb. per ac. rate, (a) and (c) gave the best weed control. Average rice yields were 12 and 3.8 barrels per ac. from treated and untreated plots, respectively.—P.J.B.

1162 Wiede, W. Unkrautbekämpfung durch Wuchsstoffe. [**Control of weeds by growth substances.**] *Z. Pfl. Ernähr. Düng.* 1950, **50**, 175-86. [Landw. Versuchsstation, Limburgerhof, BASF, Ludwigshafen]

U46 is a German name for the sodium salt of 2,4-

dichloro-phenoxyacetic acid. Weeds are classified into four groups according to the ease with which they are killed by U46 when applied at the rate of 0.5 to 2.0 kg./ha. U46 is particularly successful against *Raphanus raphanistrum* and *Sinapis arvense*, but fails to kill members of the Gramineae. Members of the Umbelliferae, particularly *Heracleum sphondylium*, are resistant to U 46. In practice, it is generally applied at 1 kg./ha. Cereals were undamaged after its use and their yields increased by 21 %.—D.B.

1163 ALDRICH, R. J. **A field technique for screening new herbicides.** *Proc. 5th Northeastern Weed Control Conf.* 1951, pp. 29-30. [Mimeographed] [New Jersey Agric. Expt Sta., Rutgers]

The technique described involves the planting of a large number of field and vegetable crops in rows 300 ft. long and 42 in. apart. Herbicides are applied in strips 3 ft. wide across all the rows. Controls are left in the form of 1 ft. borders between pre-emergence treatment strips and 3 ft. borders between post-emergence treatment strips. In tests in 1950, 53 of the more important field and vegetable crops were planted and 39 pre-emergence and 10 post-emergence treatments made. A number of promising herbicidal treatments are briefly noted. Pre-emergence treatments with 2, 4 and 8 lb. per ac. of the amine salt of dinitro-ortho-secondary-butylphenol gave excellent control of crabgrass (*Digitaria* spp.), *Chenopodium album* and redroot pigweed (*Amaranthus retroflexus*). The 8 lb. per ac. rate damaged a number of the crops [not specified], but the 2 lb. per ac. rate gave good weed control and only caused minor damage to most of the crops. Pre-emergence treatments with sodium 2,4-dichlorophenyethyl sulphate gave excellent weed control and was not so toxic to the crops as 2,4-D.—P.J.B.

1164 CIFERRI, R., and BERTOSSI, F. Metodi biologici di saggio degli erbicidi selettivi. [**Biological methods for testing selective herbicides.**] *Atti Ist. bot. Univ. Pavia* Ser. 5, 1950, **8**, 167-76, bibl. 17, English summary p. 176.

The laboratory methods usually employed for testing selective herbicides are briefly reviewed. The authors believe that their method, which consists in immersing the whole aerial part of the plant in the herbicide and then growing it in a nutrient solution to observe its reactions, best reproduces the effect of the herbicide in the field. The method still needs to be improved and standardized. Methods for testing auxins are not considered. From *Herbage Abstracts*.—E.B.

1165 MINARIK, C. E. **Pre-emergence herbicides and their behaviour.** *Proc. 5th Northeastern Weed Control Conf.* (*Supplement*) 1951, pp. 29-39, bibl. 34. [Mimeographed] [Chemical Corps, Camp Detrick, Frederick, Md]

A symposium of views is given on the fate of herbicidal chemicals in the soil. The herbicides reviewed are 2,4-D, the dinitro-type compounds, TCA, potassium cyanate, Endothal (3-6-endoxohexahydrophthallic acid), cyanamide, IPC and petroleum oils. The main factors causing their disappearance from the soil are considered to be leaching and microbial activity—P.J.B.

1166 LINDER, P. J, **Absorption of some new herbicides by plants.** *Proc. Northeastern Weed Control Conf.* 1951, pp. 7-12. [Mimeographed] [Plant Industry Bureau, US Dept Agric., Beltsville, Md]

Soil, leaf and stem applications of a number of new herbicides were made to Black Valentine snap beans and Clinton oats, as representative of broadleaf and grass-type plants respectively. In all cases, the leaves and stems were treated with 0.005, 0.05 and 0.5 mg. and the roots (soil treatment) with 0.5, 5 and 50 mg. of herbicide in an aqueous solution containing a wetting agent. With sodium 2,4-dichlorophenoxyethyl sulphate soil applications, only the 5 and 50 mg. treatments to beans and the 50 mg. treatment to oats resulted in a complete kill of the plants. With 3,6-endoxohydrophthalates, the 0.5 mg. stem applications resulted in a complete kill of the bean plants and soil applications resulted in a complete kill of all the oat and bean plants. With maleic hydrazide, aqueous solutions were readily translocated both upwards and downwards in the plant and similar degrees of injury to both the bean and oat plants followed root, stem and leaf applications. With Methoxone (2-methyl-4-chlorophenoxyacetic acid), leaf applications to beans caused stem curvature and growth retardation, but did not sufficiently injure the plants to kill them. Stem applications caused severe malformation of the plants. At the 0.5 mg. rate of application enough of the herbicide moved down into the roots to kill about 50 % of the plants. The 5 and 50 mg. soil applications caused a complete kill of all the plants. With oats, the 0.5 mg. leaf applications killed about 33 % of the plants. The soil treatments resulted in a complete kill of all the plants. With IPC (isopropyl-N-phenyl carbamate) and a chlorinated form of IPC, leaf and stem applications were relatively ineffective in both oats and beans. Soil applications caused deformation and stunting in the plants. With phenyl mercuric acetate, bean leaf treatments caused slight to severe burning of the treated parts. Soil treatments with 50 mg. of this herbicide killed approx. 50 % of the bean plants. With oats, the 5 and 50 mg. soil treatments caused growth retardation and, in the case of the 50 mg. treatment, the death of about 50 % of the plants. With crabgrass (*Digitaria* spp.) seedlings, leaf treatment caused severe localized tip burning of the plants, but no permanent injury. Soil treatments caused rapid killing of all the plants.—P.J.B.

1167 DALLYN, S. L., and SWEET, R. D. **Theories on the herbicidal action of petroleum herbicides.** *Proc. Northeastern Weed Control Conf.* 1951, pp. 13-17. [Mimeographed]

1168 LEAPER, J. M. F., and BISHOP, J. R. **Relation of halogen position to physiological properties in the mono-, di,- and tri-chlorophenoxyacetic acids.** *Bot. Gaz.* 1951, **112**, 250-8, bibl. 24. [Amer. Chem. Paint Co., Pa]

The highest physiological activity of chlorophenoxyacetic acids has been shown to be associated with the presence of two unsubstituted positions in the benzene ring para to each other. The possibility of the formation of compounds having quinonoid structure being connected with their maximum herbicidal potency is discussed.—From authors' summary.

1169 TISCHLER, N., and others. **Activators which considerably increase the defoliant and the phytotoxic properties of Endothal.** *Proc. 5th Northeastern Weed Control Conf.* 1951, pp. 35-40, bibl. 4. [Mimeographed] [Sharples Chemicals, Inc.]

A number of compounds used as adjuvants were found markedly to increase the phytotoxic and defoliant properties of Endothal (disodium 3, 6-endoxohexahydrophthalate). Ammonium sulphate proved the most suitable of those tested for practical use. A wetting agent Nonic 218, used both alone and in combination with ammonium sulphate, increased the effectiveness of Endothal. On the basis of the response by bean plants to injection, the inherent phytotoxicity of Endothal was equal to, or slightly greater than, that of 2,4-D.—P.J.B.

1170 AKAMINE, E. K. **Persistence of 2,4-D toxicity in Hawaiian soils.** *Bot. Gaz.* 1951, **112**, 312-19, bibl. 36. [Univ. Hawaii, Agric. Expt Sta., Honolulu]

In general, higher temperatures, higher soil pH values and a high bacterial count were associated with a more rapid rate of dissipation of 2,4-D. Organic matter content and adsorptive capacity of the soils were not correlated with the degree of persistence of 2,4-D.—D.B.

1171 VERONA, O. Effetti di alcuni erbicidi selettivi sulla microflora, in particolare, del terreno. [**Effect of some selective herbicides on the microflora, particularly, of the soil.**] *Ann. Fac. Agr. Univ. Pisa* 1948, **9**, 189-99, bibl. 6, French, English and German summaries pp. 189-90. [Received 1951]

In a field investigation it was found that Agroxone, Extar-Sandoz, Borweed and Weedone, in the doses usually employed, do not affect the micro-organisms of the soil.—E.B.

1172 ALLEN, W. W. **Progress report on volatility of some esters of 2,4-D.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 7-12. [Mimeographed]

1173 TALLEY, P. J. **Equipment for post-emergence weed control and research in its use.** *Proc. 3rd Southern Weed Conf.* 1950, pp. 116-31. [Mimeographed]

CROP BOTANY

1174 BAEZ, J. R. Breves apuntes sobre la migración de las plantas agrícolas euro-indianas en el momento del descubrimiento. [**Short notes on the migration of European and Indian agricultural plants at the time of the discovery of America.**] *Lilloa* 1949, **18**, 331-60, bibl. in text, pl. 7. [Received 1951] [Dept Bot., Museo Entre Ríos, Paraná, Argentina]

This historical study includes notes on early agricultural experiments in the New World and contains much information on the indigenous and introduced crop plants of South America. On p. 338 there is a list of European food plants and a parallel list of South American substitutes.—G.M.R.

1175 BURKART, A. Proposición de tres términos de índoles biológica y agronómica. [**Three new terms of biological and agronomic significance.**] *Lilloa* 1949, **19**, 71-3, English summary p. 71. [Received 1951] [Fac. Agron., Univ. La Plata, Inst. Bot. Darwinion, San Isidro, Argentina]

The following three additions to Spanish botanical terminology are proposed. Anfistemonia, an English version of which would be amphistemonia, indicates the case of inflorescences bearing haplostemonous and diplostemonous flowers at the same time, a condition observed in some spp. of *Mimosa*. Homosis indicates the genotypical condition which is the reverse of heterosis, results from inbreeding and produces loss of vigour or degeneration and progressive sterility. The term must not be confused with homoeosis. Semillión is the Spanish equivalent, hitherto lacking, for the English word " seedling." The first two words proposed are to be incorporated in the botanical dictionary now in course of preparation by P. Font Quer, of Barcelona, Spain.—G.M.R.

1176 Hourquebie, Haydée, and others. Primera contribución a la bibliografía fitoquímica argentina. [**First contribution to the bibliography of plant chemistry in Argentina.**] *Lilloa* 1949, **18**, 5-70. [Received 1951] [Mus. Arg. Ciencias Naturales, Buenos Aires]

This valuable list of approximately 1000 references to the literature includes material available in European and North American publications, as well as that which has appeared in South America, and is the first part only of the work projected. The second part will catalogue the Argentine plant species already studied, giving an indication of the principles contained in them, the authority and reference being given in each case. From *Herb. Abstr.*—G.M.R.

1177 Couto, Maria Elisa. Primera contribución a la bibliografía fitoquímica del Uruguay. [**First contribution to the bibliography of plant chemistry in Uruguay.**] *Lilloa* 1949, **18**, 77-80, English summary p. 77. [Received 1951] [Asoc. Rural del Uruguay, Montevideo]

A preliminary list is given of 20 references to literature published in Uruguay on the chemistry of that country's plants. It is hoped to amplify this in due course. From *Herb. Abstr.*—G.M.R.

1178 Mann, G. **Atomic research applied to farming.** *Indian Fmg* 1950, **11**, 305-7.

This reprint from *Science Digest* gives a popular account of the use of radio-active tracers, and of the effects of radio-activity on plant growth and heredity.—N.G.S.

1179 Gossweiler, J. Flora exótica de Angola. Indice dos nomes botânicos actualizados e sinónimos. [**Exotic flora of Angola. Index of botanical names used and their synonyms.**] *Agron. Angolana* 1950, **4**, 167-94. See Abs. 517.

1180 Breazeale, E. L., and others. **Nutrition of plants considered as an electrical phenomenon—a new approach.** *Soil Sci.* 1951, **71**, 371-5, bibl. 4. [Arizona Agric. Expt Sta., Tucson]

Experimental evidence is presented in support of the theory that ion absorption by plants is an electrical phenomenon. Details are given of a technique in which a Fisher electropode is used to study the ion absorption of plants.—From authors' summary.

1181 Commission Internationale des Industries Agricoles. La nutrition minérale des plantes. Bibliographie. [**The mineral nutrition of plants. A bibliography.**] Paris, [n.d.], pp. 78, bibl. 340. [Mimeographed]

1182 Erkama, Jorma. **Effect of copper on the iron uptake of plants.** *Acta Chem. Scandin.*, 1949, **3**, 980-7. [Biochem. Inst., Helsinki]

The iron uptake of peas was studied in sterile water cultures containing 10 mg. Fe per litre by using different nitrogen sources and varying the copper concentrations. The oxidation-reduction potentials of the culture solutions were observed. The effect of copper on the iron uptake was correlated with the effect on the electrode potential in the nutrient solutions.—From author's summary.

1183 Millikan, C. R. **Radio-autographs of manganese in plants.** *Aust. J. sci. Res.* Ser. B. 1951, **4**, 28-41. [Dept Agric., Burnley, Vict.]

Flax, peas, cabbage, and tomato plants were grown in nutrient solutions to which radio-active manganese (0.035 mc. of Mn^{54}) was added with an excess of non-labelled manganese. The treatments included an excess of molybdenum as ammonium molybdate or sodium molybdate in addition to the excess manganese. With flax and peas a further radio-active treatment was studied in which the total manganese level was normal (0.5 ppm). Radio-autographs and radio-assays of various plant tissues were made. The oldest leaves of the plant were higher in manganese than the youngest leaves. There was a characteristic accumulation of manganese in the distal third of flax leaves, in the margins of leaflets and stipules and the tips of tendrils of peas, in the margins of cabbage leaves, and in the terminal leaflet and tips of other leaflets of tomato leaves. With flax and peas the above accumulations were demonstrated irrespective of whether there was a normal or excess level of manganese in the nutrient solution. Before the onset of necrosis it was also shown with peas, cabbage, and tomato that the accumulation of manganese occurred in the interveinal tissues. Flax plants receiving the normal manganese level showed, in addition to the leaf tip accumulation, numerous minute localized concentrations of manganese throughout the tissues of the older leaves and cotyledons, and, ultimately, the base of the stem. This phenomenon occurred to a very limited extent only at the excess manganese level.

In the presence of applied molybdenum the plants in general had a lower concentration and a more uniform distribution of manganese. In certain instances the distribution was quite abnormal in that the leaf centre had a higher concentration of manganese than the corresponding leaf edge. The onset of necrosis was associated with a marked accumulation of manganese in the tissues concerned. However, it was further demonstrated with peas, cabbage, and tomato that there is actually a withdrawal of manganese from the tissues as the necrosis becomes complete.

Successive radio-autographs of the same pea plants have shown that a movement of manganese from the interveinal tissues into the veins occurs as the plant dries out. This indicates the possibility that radio-autographs may not provide a true pattern of the location of the manganese as it occurs in the living plant.—Author's summary.

1184 Di Palma Castiglione, R., and Landi, S. L'azione del molibdeno sui microrganismi e sulla vegetazione. [**The action of molybdenum on micro-organisms and vegetation.**] *Ann. Fac. Agr. Univ. Pisa* 1948, **9**, 313-35, bibl. 56, French, English and German summaries pp. 313-14. [Received 1951]

The present knowledge in this subject is summarized. Results of laboratory trials, carried out by the authors, showed that molybdenum has a stimulating effect in the first stages of development of wheat.—E.B.

1185 Barbier, G., and others. **Utilisation of phosphatic fertilisers by plants, after their absorption into the soil.** *Trop. Agriculturist* 1949, **55**, 30-3, bibl. 5. [Received 1951] [Central Sta. Agron., Versailles]

1186 Roberts, L. W. **Survey of factors responsible for reduction of 2,3,5-triphenyltetrazolium chloride in plant meristems.** *Science* 1951, **113**, 692-3, bibl. 8.

1187 Favilli, R. Sull'azione che l'uranio ed alcuni suoi composti svolgono sulla vegetazione. [**The action of uranium and some of its compounds on vegetation.**] *Ann. Fac. Agr. Univ. Pisa* 1946, **7**, 44-84, bibl. 69. [Received 1951]

Small doses of uranium appeared to have a stimulating effect on plant development.—E.B.

1188 Cavazza, L. Osservazioni sulla determinazione dell'energia germinativa. [**Observations on the determination of germination energy.**] *Ann. Fac. Agr. Univ. Bari* 1950, **7**, 211-21, bibl. 20. [Ist. Agron. Univ. Bari]

There are some difficulties in evaluating the germination energy which refers to a complex of characters such as the velocity of germination, the vigour of the germ, etc. The various methods adopted to evaluate the germination energy are reviewed and discussed. It is concluded that none of these methods is perfect, and the choice of the method must be decided each time according to the object of the trial.—E.B.

1189 Haripada Chattopadhyay, and Sachchidananada Banerjee. **Effect of germination on the carotene content of pulses and cereals.** *Science* 1951, **113**, 600-1, bibl. 7. [Physiol. Dept, Presidency Coll., Calcutta]

The carotene content of the seed of a number of cereal and pulse crops in all cases increased considerably within 4 days of the beginning of germination. In the case of rice, wheat and maize, the carotene content of the dry seed was 0.35, 0.45 and 4 mg. per 100 grm of seed, compared with 3.95, 4.65 and 6.15 mg. per 100 grm of seed, respectively, 10 days after the beginning of germination. The results indicated that the rate of increase in the carotene content of both pulses and cereals depended on the rate of growth of their seedlings. From the dietetic point of view, the nutritive value of germinated pulses was superior to that of ungerminated seed, not only in respect of carotene content, but also the content of other vitamins.—P.J.B.

1190 Dadykin, V. P. **Swelling of seeds in frozen soil** [Russian] *Doklady Akad. Nauk SSSR* 1951, **77**, 333-6, bibl. 12.

On the basis of investigations on the swelling of vetch seeds (*Vicia* sp.) in frozen soil at different temperatures and the determination of the magnitude of the suction force of the seeds at different degrees of their swelling, the following conclusions may be drawn. The osmotic system is able to take up water from frozen soil. The water in frozen soil is mobile. The magnitude of the necessary suction force is determined by the temperature of the frozen soil. The absolute magnitude of the force retaining the water in frozen soil at a temperature up to − 1°C. is not great and does not exceed the force of the osmotic pressure usually observed in the roots of the plants.—R.P.J.

1191 Cercós, A. P. Effecto de la bacilomicina y fungocina sobre la germinación del trigo. [**Effect of bacillomycin and fungocina on wheat germination.**] *Rev. Argent. Agron.* 1951, **8**, 33-5, illus.

Bacillomycin and fungocina are antibiotics produced by *Bacillus subtilis*. Seeds of the wheat varieties 38 M.A. and Ridit were used for the experiments. Bacillomycin at 0.2 % appeared to stimulate wheat germination, although the absence of root hairs was noted; at 0.5 % it began to slow down germination and inhibit subsequent growth; in solutions of over 1 %, the development of the shoot was inhibited. Fungocina at 0.2 % inhibited the formation of root hairs ; at 2 % the growth of the rootlets was retarded ; while at 4 % the growth of the shoot was partially inhibited and growth of the roots completely inhibited.—N.G.S.

1192 GOLUBINSKIĬ, I. N. [**The effect of the admixture of pollen from surrounding plants on the germination of a plant's pollen.**] [Russian] *Doklady Akad. Nauk SSSR* 1951, **76**, 591-2, bibl. 2. [Duben Agric. Tech. Sch. Rovenskaja Prov. Ukrain. SSSR.]

Germination of pollen grains of *Vicia sativa*, *Pisum sativum*, *Cannabis sativa*, *Onobrychis* sp. and *Papaver* sp. was greatly increased following the addition to the pollen of pollen from different species surrounding the plant in question at the time of flowering.—R.P.J.

1193 DADYKIN, V. P. [**The influence of temperature in the root zone on the development of the ear in barley and oats.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, 1155-7, bibl. 8.

It may be assumed from this investigation that low temperature of the soil, like drought, causes profound physico-chemical and osmotic changes in the protoplasm, and in the synthesis of protein substances etc., where also the causes of the disturbances of biologic functions of the plants under these conditions are to be looked for.—R.P.J.

1194 SALONEN, M. Muokkauskerroksen alla olevien maakerrosten merkityksestä kasvinviljelyssä. [**On the significance of subsoil to crop plants.**] *Maataloust. Aikakausk.* 1951, **23**, 33-43, bibl. 17, English summary. [Crop Husbandry Inst., Helsinki Univ.]

Trials were conducted in Finland in which oats were grown in undisturbed subsoil in the field to determine the significance of the subsoil as an environment for roots. A technique was evolved in which the oats were grown in tubes containing sterile sand, the tubes being inserted in the soil in such a way that the plant roots penetrated the subsoil after traversing the tubes. Plants growing under these conditions developed normally and, in some cases, yielded grain, but they remained very small in size. It was concluded that N was the element most lacking in subsoil.—P.J.B.

1195 WUNDERLICH, G. Kritische Untersuchungen zur Prüfung der Standfestigkeit an Jungpflanzen. [**Critical investigations in the rigidity of young plants.**] *Bodenkultur* 1950, **4**, 48-69, bibl. 17. [Hochschule für Bodenkultur, Wien]

Resistance to bending in young plants was determined using a modification of Niggemann's laboratory method. After 8 days' growth, cereals (grown in pots) were cut back to an even height, the height of cut being at 70 % of plant growth above the cotyledon or 60 % of leaf height above the cotyledon. Each pot of cut plants was then brought beneath the scale pan of a balance (the pan being supported by shortened supports) and a measured quantity of water was poured into a flask placed on the scale pan until the vertical pressure so exerted was sufficient to cause the leaves of the plants to collapse. The required volume of water was a measure of the resistance to bending of the leaves. The operation was repeated when the plants had straightened out. Results are tabulated for several varieties of cereals of different years and of different origin and for plants grown under different conditions of light, darkness, and water deficiency. In these experiments it is the breaking strength of the first leaf, not of the stem, which is measured. The applicability of the results to crops in the field is therefore in doubt but an attempt is made to answer this question.—D.B.

1196 BOND, G. **Symbiosis of leguminous plants and nodule bacteria. IV. The importance of the oxygen factor in nodule formation and function.** *Ann. Bot., Lond.* N.S., 1951, **15**, 95-108, bibl. 13. [Bot. Dept, Univ. Glasgow]

Nodulated plants of soyabean have been grown in culture solutions lacking combined nitrogen and in continuous contact with oxygen/nitrogen gas mixtures containing 21, 12, and 5 % oxygen respectively. Reductions of oxygen content led to reductions in dry weight and in fixation of nitrogen. Somewhat similar but smaller effects on dry weight were observed with non-nodulated plants supplied with ammonium-nitrogen, but such plants supplied with nitrate-nitrogen grew equally vigorously at all three oxygen levels, a result regarded with some reservation. The weight of nodules per plant was markedly reduced by curtailment of oxygen, but the number was unaffected, indicating that the earlier stages in nodule formation are not specially sensitive to oxygen supply. The greater effect of oxygen reduction on nodulated plants appears to be exerted on the process of fixation or on associated processes such as nodular respirations.—Author's abstract.

1197 MICHAEL, G., and ZANDER, H. Über den Zusammenhang zwischen Reifegrad und Qualität pflanzlicher Ernteprodukte. [**The connexion between stage of maturity and quality of crops.**] *Dtsch. Landw.* 1949, **3**, 86-8, bibl. 12. [Berlin]

1198 REDDI, K. K. **Studies on anti-thiamine factor in mustard (*Brassica juncea*). Part I. Isolation and kinetics.** *Proc. Nat. Inst. Sci. India* 1951, **17**, 39-44, bibl. 10. [Dept Biochem., Indian Inst. Sci., Bangalore]

Mustard was shown to contain an active nonenzymic principle which destroys thiamine. The method of isolating this factor is described.—N.G.S.

1199 GRACÉS, O. C. Naturaleza de la resístencía a la enfermedád, en las plantas. [**Nature of disease resistance in plants.**] *Rev. Fac. Nac. Agron.* 1949, **10**, 334-58, bibl. 53. [Received 1951]

1200 HEY, G. L., and HOPF, P. P. **A new theory of the action of plant hormones.** [Reprint from] *Grower* 1951, **35**, Nos. 2, 3 and 4, and report of lecture by G. L. Hey, at Ipswich, Feb. 51.

It is postulated that the effectiveness of hormone herbicides depends upon the presence of vitamin K in the treated plant. The higher the vitamin K content the more effective the hormone herbicide; where vitamin K is absent, the plant is not affected. It is further propounded that hormones absorbed naturally by plants are only effective in the presence of a naturally occurring vitamin, acting as a co-reactant, and, from this, that maximum effect can only be got from applied growth-promoting substances if a suitable co-reacting vitamin is administered simultaneously. Apart from the growth hormones and vitamin K, other vitamins are claimed to be responsible for the stimulation of properties other than growth when used in conjunction with their corresponding co-reactants. Experiments were carried out to support this theory on various plants, including small-scale trials on peas, cereals and sugar beet. [The hormones used included 2,4-D and ANA.] Treated peas showed no differences in yields when treated with the vitamin K group, but responded to two other vitamins by giving an earlier crop. Increases were obtained from seed treatment with hormone + co-reacting vitamin in a single replicated trial with wheat variety N. 59. With sugar beet, decided increases in weight of individual beet have been obtained, usually accompanied by increases in the percentage sugar content. A mixture of vitamin Bpp with a suitable co-reacting substance [name not stated] gave increased sugar content, and when this combination was mixed with vitamin H plus a suitable co-reacting hormone [name not stated] increased yields and sugar content were obtained. —N.G.S.

1201 FERRI, M. G. Síntese, natureza química, modo de ação e inativação dos fitohormônios. [**Synthesis, chemical nature, mode of action and inactivation of phytohormones.**] *Rodriguésia* 1949, **12**, 3-18, bibl. 32, French summary pp. 14-15.

This is a summary of the most recent work on growth hormones.—N.G.S.

1202 MER, C. L. **A critical study of the auxin theory of growth regulation in the mesocotyl of *Avena sativa*.** *Ann. Bot., Lond.* N.S., 1951, **15**, 179-207, bibl. 53. [Res. Inst. Plant Physiol., Imp. Coll. Sci. Tech., London, S.W.7]

1203 BERTOSSI, F., and CIFERRI, R. Contributo alla conoscenza dell'attività fitoinibitoria del γ-esaclorocicloesano. [**A contribution to the knowledge of the plant inhibitory activity of γ-hexachlorocyclohexane.**] *Atti Ist. bot. Univ. Pavia* Ser. 5, 1950, **8**, 129-38, bibl. 45, English summary p. 137.

1204 ZIMMERMAN, P. W., and HITCHCOCK, A. E. **Growth-regulating effects of chlorosubstituted derivatives of benzoic acid.** *Contr. Boyce Thompson Inst.* 1951, **16**, 209-13, bibl. 10.

Both, 2,3,6-trichlorobenzoic acid and 2,3,6-trichlorobenzaldehyde applied to tomato plants, caused cell elongation and proliferation of tissue, induced the growth of adventitious roots, modified the pattern of leaves and other organs and caused the parthenocarpic development of fruit. It was concluded that these two chemicals should be included in the list of well-known hormone-like plant growth regulating substances.—Authors' summary.

1205 BERTOSSI, F. L'idrazide maleica come fitormone. [**Maleic hydrazide as a plant hormone.**] *Atti Ist. bot. Univ. Pavia* Ser. 5, 1950, **8**, 155-66, bibl. 15, English summary pp. 165-6.

Preliminary trials were carried out to study the effect of maleic hydrazide on various plants including *Lupinus albus* (Macht's test). Although results were indicative only, the author is of the opinion that maleic hydrazide cannot be considered as a typical growth-regulating substance, but as a chemical with a small, but selective, toxicity.—E.B.

1206 KASTING, R., and WOODWARD, J. C. **Persistence and toxicity of Parathion when added to the soil.** *Sci. Agric.* 1951, **31**, 133-8, bibl. 9. [Chem. Div., Sci. Service, Ottawa]

Oats were grown in half-gallon pots containing untreated soil and soil treated with 2, 12 and 100 lb. per ac. of technical Parathion. The soil was maintained at approx. 60 % of its moisture-holding capacity. Parathion was not detectable in the soil beyond 16 days after the 2 lb. per ac. treatment, or beyond 79 days after the 12 lb. per ac. treatment. At 165 days after the 100 lb. per ac. treatment, the content of Parathion in the soil was 1.2 ppm. (2.4 lb. per ac.), after 325 days only a trace of Parathion remained in the soil. The Parathion had no apparent effect on the seed germination or grain yield of the oats. The Parathion content of the oats analysed 40 days after sowing was 0.02 and 0.1 ppm for the 2 and 100 lb. per ac. treatments, respectively. Following the 100 lb. per ac. treatment, there was a significant increase in the phosphorus content of the oats, compared to the controls.—P.J.B.

1207 HITCHCOCK, A. E., and ZIMMERMAN, P. W. **A quantitative method of measuring response of plants to growth regulators.** *Contr. Boyce Thompson Inst.* 1951, **16**, 225-48, bibl. 12.

Results with 2,4-D applications to tomato plants showed that the technique described, for measuring the response of plants to growth-regulating substances, is about three times as sensitive as the standard lanolin and spray solution methods, in respect of the measurement of the minimum quantity of 2,4-D required to induce a given magnitude of response. The method involves the use of a rapid statistical procedure for evaluating results and an improved qualitative technique for the application of growth-regulating substances to plants.—P.J.B.

1208 CUMMING, H. W., and MITCHELL, K. J. **Application of the xenon arc-discharge to experiments in crop physiology.** *Nature, Lond.* 1951, **167**, 567-8, bibl. 3. [Res. Labs., Siemens Elect. Lamps and Supplies Ltd, Preston, Lancs, (H.W.C.) and Bot. Dept, Univ. Manchester, (K.J.M.)]

The radiation from xenon arc-discharge lamps is apparently suitable for experiments designed to study crop growth, if the plants used are screened from the wavelengths less than 3200 Å by a sheet of glass 3/16 in. thick.—M.H.

1209 MACKEY, J. Kemiska snabbmetoder för bestämning av grobarhet hos frö. [**Chemical methods for rapid determination of the germinability of seed.**] *Nord. JordbrForsk* 1950, **3/4**, 283-314, bibl. 108, English summary. [Sveriges Utsädesförening, Svalöf]

Methods of shortening the time necessary for ordinary germination tests for seed are reviewed. Where very rapid determinations of the viability of seed are required, methods which indicate the viability of the seed must be used. Various methods based on the chemical reactions that take place in viable seed, are reviewed and discussed in detail. Methods based on the respiration of seed, its reaction to electric current and its capacity to withstand the extraction of electrotytes or colloids are rejected as being too indeterminate. A large proportion of the methods used for the determination of seed viability is based on the detection of specific enzymes, or enzyme groups, in viable seed. The exactness of these methods lies in their precision in detection of the transition from life to death in seed. Among methods lacking this precision are those based on diastase, catalase, or phenolase enzymes. The dehydrase and peroxidase reactions appear to provide a satisfactory indication of viability. The use of 2, 3, 5-triphenyl-tetrazolium chloride and sodium biselenite, based on the dehydrase reaction, have given good results in the topographical mapping of viable areas in seed. For the peroxidase reaction, benzedene and guaiacol are satisfactory colour indicators, and with peas, the use of malachite green has proved satisfactory. Where the highest degree of exactitude in tests is required, a combination of the normal germination tests and the colour reaction procedures have proved valuable, particularly if seed dormancy is a limiting factor. This method has been recommended, in particular, for cereal seed. Reference is also made to an improvement on the colour reaction method, involving the use of sodium biselenite and indigo-carmine. The limitations of methods using biochemical determinations of seed viability are outlined. Reference is made to the high demands placed on labour by these methods, and the unreliability of their results, compared with the normal germination procedures, where factors such as seed infection are operative.—P.J.B.

1210 CASIDA, J. E., and ALLEN, T. C. **A laboratory method for evaluating the phytotoxicity or phytostimulation of insecticides.** *Science* 1951, **113**, 553-5, bibl. 4. [Entomol. Dept, Wisconsin Univ., Madison]

The technique described involved the measurement of Kentucky Wonder pole-bean stem sections, grown under standardized conditions in a nutrient solution. The method gives rapid and quantitative results.—P.J.B.

1211 SOUTH AFRICA Department of Agriculture. Sci. Bull. No. 312. **A spectrochemical method for the determination of potassium in organic and biological materials.** By *J. E. Potgieter.* 1950, pp. 10. [Western Province Fruit Res. Sta., Stellenbosch]

1212 SEAY, W. A., and others. **Elimination of calcium interference in photometric determination of sodium in soils and plants.** *Soil Sci.* 1951, **71**, 83-90, bibl. 3.

MISCELLANEOUS

1213 Blondeleau, L. Organisation des recherches agronomiques en Afrique Occidentale Française. [**Organization of agronomic research in French West Africa.**] *Agron. trop.* 1951, **6**, 174-8.

1214 Bradfield, R. **Plant nutrient research in the decade ahead.** *Agron. J.* 1951, **43**, 161-6. [Agron. Dept, Cornell Univ., Ithaca, N.Y.]
A review is given of possible lines of future research for improving crop yields in the USA. The estimated percentage of the maximum possible yields of different crops attained at the present time is given as 25 to 35 % for pasture and hay crops, 50 to 60 % for maize, wheat and oats and 70 to 80 % for potatoes and high acre-yield horticultural crops. With high acre-yield crops, the author considers that most farmers are at the limit of maximum net returns, and that little additional increase can be expected from manurial applications. Future lines of research, it is thought, will probably be directed towards the micro-nutrient status of soils and increasing the depth of soil and also the fertility of soil at depths greater than those used at the present time. Plants growing in soil whose depth and fertility at depth encourages deep rooting, will tolerate greater lateral competition above the soil, thus permitting increases in plant density. Experiments at the Ohio and Missouri Stations indicated that maize grown on double the normal soil depth outyielded maize grown on the normal soil depth by between 25 and 50 %, even though both soils received the same manurial treatment.—P.J.B.

1215 Ferreira da Silva, A. O clima de Angola. [**The climate of Angola.**] *Agros* 1951, **34**, 5-14.

1216 Jacinto Burgos, J., and Vidal, A. L. Los climas de la Republica Argentina segun la nueva clasificacion de Thornthwaite. [**The climates of Argentina according to Thornthwaite's new classification.**] *Meteoros* 1951, **1**, 3-32, bibl. 29, maps 11.
The climates of Argentina are mapped according to Thornthwaite's (1948) " Rational Classification of Climate." Fifty-four types are recognized, ranging from B_4, $B^1{}_1$, r, a^1, to E^1. The regional locations of the main types are noted in the text. Other systems of climatic classification are briefly reviewed.—N.G.S.

1217 Pérez-moreau, R. A. Una variante al gráfico o diagrama hidrotérmico de Raunkiaer. [**A variant to the hydrothermic graph or diagram of Raunkiaer.**] *Lilloa* 1949, **20**, 105-6, English summary p. 105. [Received 1951] [Museo Arg. Ciencias Naturales, Buenos Aires]
The complete study is to appear in the organ of the National Institute for Research in the Natural Sciences, Buenos Aires, *Ciencias Botánicas*, Vol. 1, No. 1. It is proposed to substitute monthly mean " active temperature " (Ta) for Raunkiaer's monthly mean temperature (T) ; and monthly mean " effective precipitation " (Pe) for Raunkiaer's monthly mean rainfall (P).—G.M.R.

1218 Loewe, F. **Some microclimatic considerations of agricultural interest.** *J. Aust. Inst. agric. Sci.* 1951, **17**, 2-6, [Univ. Melbourne]
The subject is dealt with under the following heads : inclination and aspect of slopes, seasonal effects of insolation, importance of surface colour, intake and loss of heat radiation by the ground, effect of plant litter and ploughing, effect of plant cover, temperature gradient in crops, differences between plant and air temperatures, effects of vegetation on humidity and wind velocity and some examples of ways to modify the microclimate.—K.L.

1219 Neergaard, P. Retningslinierne ved af prøvning af fungicider. [**The choice of methods for the testing of fungicides.**] *Nord. Jordbr Forskn.* 1949-50, **3/4**, 212-32, bibl. 24.
A review is given of various methods applicable to the testing of fungicides used for seed disinfection and the spraying and dusting of crops.—P.J.B.

1220 Gottlieb, D., and others. **Endomycin, a new antibiotic.** *Phytopathology* 1951, **41**, 393-400, bibl. 18. [Illinois Univ., Urbana]
Endomycin has been isolated from cultures of an unidentified species of *Streptomyces*. It has been shown to inhibit the growth of a large number of fungus species.—P.J.B.

1221 Kreutzer, W. A., and others. **The fungicidal and nematocidal properties of dibromobutene.** *Science* 1951, **113**, 657-8, bibl. 4.
The results of tests indicated that trans- 1,4-dibromobutene-2 may be of value as a solid fungicidal and nematocidal soil fumigant. In the control of *Heterodera schachtii*, adequate mixing of the nematocide with the upper 2 in. layer of soil was essential. Both pea and sugar beet seed were outstanding in their tolerance to dibromobutene at concentrations sufficient to control nematodes in soil. —P.J.B.

1222 United States Department of Agriculture. Circ. No. 862. **Some plant responses to certain insecticides in the soil.** By *A. C. Foster*. 1951, pp. 41.
The results are given of greenhouse and field trials to determine the effect on crops and the persistence in the soil of applications of 25, 100, 400 and

1000 lb. per ac. of DDT, 100, 200, and 400 lb. per ac. of technical BHC and 25, 100 and 400 lb. per ac. of Chlordane, made on loam, sandy-loam, loamy-sand and acid muck soils. Of the crops tested on mineral soil, Abruzzi and Rosen rye were the most sensitive to DDT. Applications of 100 lb. per ac. of DDT significantly reduced the growth of these crops, as compared to untreated controls. Beans were moderately to highly susceptible to DDT, while grain crops, including maize, and brassicas were moderately to highly resistant. At equivalent rates of application, crops grown on mineral soils were much more susceptible to DDT toxicity than those grown on acid muck soils. There was no significant reduction in the toxicity of DDT in the soil to plants over a 4-year period. The O, p^1 isomer of DDT was much more toxic to plants than the p, p^1 isomer. At equivalent rates of application, BHC was more injurious to the seed germination of crops, but was less persistent in the soil than DDT. Application of 300 lb. per ac. of technical BHC caused significant reductions in the germination and stands of all crops tested, as compared to controls. After a 3-year period, approximately 50 % of a 100 lb. per ac. application of BHC had disappeared from the soil. Applications of 25 lb. per ac. of Chlordane significantly reduced the germination and stands of crops, as compared to controls. Among the crops tested, maize was the most resistant to Chlordane. Applications of 100 lb. per ac. of Chlordane following the germination of crops had no consistent effects on their growth ; in no cases were maize and beans affected. Limited trials with Parathion and Toxaphene were also carried out, but were not continued, owing to the lack of persistence of these materials in the soil. —P.J.B.

1223 South Africa Department of Agriculture. Sci. Bull. No. 283. **Drying of grain in bags.** By *G. M. Dreosti* and *J. D. Louw.* 1950, pp. 40. [Fruit Res. Sta., Stellenbosch]

1224 Pfalzner, P. M. **The specific heat of wheat.** *Canad. J. Technol.* 1951, **29**, 261-8, bibl. 6. [Physics Div., Nat. Res. Lab., Ottawa]

Determinations were made of the specific heat of wheat grain samples with moisture contents ranging from 0 to 15 %, by means of the "method of mixtures", a method commonly used in determinations of the specific heat of solids. The specific heat of the samples was approximately a linear function of their moisture content expressed as a percentage of their wet weight. The apparent specific heat of the water bound on the wheat molecules did not differ appreciably from that of free water over the range of moisture contents and temperatures studied.—P.J.B.

1225 Canada Department of Agriculture. Proc. Publ. Ser. No. 115. Entomology. **Grasshopper control.** By *R. H. Handford* and *L. G. Putnam.* Ottawa, 1951, pp. 20, fig. 8. [Lithoprint]

The important species of grasshopper and their life histories are briefly reviewed. Control methods outlined include the use of cultural practices, poison baits and sprays.—P.J.B.

1226 Grütz, W. Über die Wirkung von technischem Lignin im Vergleich zu anderen organischen Düngemitteln auf Pflanzenertrag und Boden. [**The effect of industrial lignin compared with other organic manures on plant yield and soil.**] *Z. PflErnähr. Düng.* 1950, **49**, 197-209, bibl. 8. [Inst. Pflanzenernährung, Bodenchemie und Bodenbiologie, Berlin-Dahlem]

1227 Li, J. C. R., and Keller, K. R. **An application of serial correlation in field experiments.** *Agron. J.* 1951, **43**, 201-3, bibl. 16. [Oregon Agric. Expt Sta., Corvallis]

The paper suggests an application of the existing knowledge of serial correlation to field experiments. —From authors' summary.

1228 Keller, K. R. **Relative efficiency of rectangular and triple rectangular lattice designs using hop uniformity trial data.** *Agron. J.* 1951, **43**, 93-6, bibl. 5.

REVIEWS AND REPORTS

REVIEWS

1229 Robinson, D. H. **The new farming.** pp. 234, London ; Faber and Faber Ltd, 1951, 23 × 14, 16s.

This book, intended for the intelligent layman, deals with all aspects of agricultural progress in Great Britain and the research work at home and abroad which has made this progress possible. The book, which was first published in 1938, has now been re-written and enlarged. The result is that an enthralling and up-to-date account is presented of the remarkable progress that has been made in many fields during the last twelve years.

The first two-thirds of the book are devoted to soil fertility and to crops, their breeding, their diseases and pests and their relationship to the soil.

Progress in soil science and the maintenance of fertility are dealt with in the first essay, and of particular interest is the account given of the development of modern commercial fertilizers and methods of applying them. A special chapter is devoted to grassland improvement, and this includes accounts of the recent advances in grass breeding at Aberystwyth, the change of attitude that has developed towards the relative values of leys and permanent grass, and the changes which have occurred in the use of various grasses and clovers for specific purposes: for instance, in pastures and long leys, seed mixtures are now much simpler and seed-rates considerably lower. The essay on field crops is full of examples of the difficulties and complexity of the plant breeders' work, while in the chapters on pests and diseases, many interesting examples are given of the painstaking researches which have resulted in the full understanding of the life histories of insect pests and of the methods by which plants become infected with the common fungus diseases. The discovery of modern insecticides and fungicides, such as DDT and the organo-mercury dusts, is described, and accounts are given of insects attacking farm animals.

The remainder of the book includes essays on animal breeding, feeding and health, and problems of agricultural engineering; and an account of research institutes and agricultural education in England and Wales. But perhaps the most interesting essay is the one which describes a miscellany of problems of a biological nature such as the control of weeds with the so-called hormone weed-killers and the role of bacteria in such varied processes as the disposal of surplus straw, compost making, nitrogen fixation, lucerne growing, silage making and the production of clean milk.—C. W. S. Hartley.

1230 MARTINEZ, R. V. Economia agropecuaria de Colombia, 1949. [**Colombian agricultural economy, 1949.**] pp. 148, Bogota; Editorial Economia Rural, 1950, 33 × 22. [Mimeographed]

This survey is based upon the 1938 population census, with estimated amendments, and upon authoritative estimates of the agricultural production for 1949. Colombia is split into three by the Eastern, Central and Western Cordilleras. Four climatic regions are recognized, the torrid zone, the temperate zone, the cold zone and the very cold zone (the paramos). Of a population of 10,766,880, 71 % were rural inhabitants, of whom 54 % were gainfully employed. The three most populous provinces of Cundinamarca, Antioquia and Caldas contributed most to the estimated total value of agricultural production for 1949 of $2,591, 658,605. Maps are given showing the average annual rainfall and temperature, and the distribution of crops and stock. Information on crops and stock is considered individually, and then in combination. The major field crops, with the estimated annual production for 1949 in thousands of tons, and the major producing Departamentos, are: sesame, 24.2, Tolima; cotton, 19.9, Tolima; rice, 207.6, Tolima and Bolivar; barley, 51.07, Nariño, Cundinamarca, and Boyaca; beans, 58.8, Antioquia; wheat, 128.3, Cundinamarca and Boyaca; cassava, 840.8, Santander and Bolivar. Maize, with a production of 737,630 tons, is the most widely distributed crop. Prices obtained for agricultural produce in the main markets are set out for each month of the year, and external agricultural trade figures are tabulated. The whole book gives a remarkably clear picture of the agricultural economy of the 15 Departamentos. [Colombia is administered in provinces known as Departamentos, Intendencias and Comisarias, according to the method of administration employed. The Intendencia del Meta forms the hinterland of Bogota, the capital.] Although figures are given for the Intendencias and Comisarias, they are grouped together, with the exception of the Intendencia del Meta. Since, however, these regions are almost entirely undeveloped, this deficiency does not detract from the value of the survey.—N. G. Shreeve.

1231 ROE, H. B. **Moisture requirements in agriculture. Farm irrigation.** pp. xviii + 413, illus., New York; McGraw Hill Book Company Inc., 1950, 24 × 16, 47s.

This is a text-book of farm irrigation intended mainly for students in the western states of the USA. Its subtitle gives a fairer indication of the contents than does the main title; indeed the moisture requirements are dealt with only in the first chapters and again when individual crops are considered. The literature cited and the examples given mostly concern the western states and it is stated in chapter XI that the middle south is not covered in this book. Consequently no mention is made of the many thousands of acres of irrigated rice in Texas, Louisiana and Arkansas. In a book with such a general title and sub-title, an exact indication of its scope might well have been included in the preface.

The first chapter deals mainly with the physical properties of soils, soil-water relationships and measurement, and a method for estimating the water requirements of a crop under given conditions. This method is expanded later after a consideration of rainfall, other water sources, evaporation and transpiration. Particular attention is given to underground water supplies and methods of recharging underground basins by the spreading of flood waters from surface rivers and streams.

The main problems of irrigation are considered in chapters dealing with flow and measurement of water, the interrelation of irrigation and drainage, irrigation methods (including overhead sprinklers), irrigation works and pumping. The methods described are those which have been well tested in the western States and excellent illustrations and diagrams are included. In these areas, with rainfall rarely exceeding 20 inches and often below 10, water conservation is of primary importance and a very thorough examination is made, in a chapter on the use of water, of the factors leading to waste and the remedies available.

The irrigation of individual crops grown in the western States is described separately. The account of rice irrigation in California is out of date, but as it is largely based on a report written in 1917 this is not surprising. Much of the rice in California, as well as in other south-eastern states, is now sown from the air. This entails prior flooding and a different method of water management. No mention is made of this or of the relation between time of water supply, weed-control and yield. The short chapter on supplemental irrigation in humid regions is mainly concerned with the irrigation of vegetables and fruit, and rice irrigation is not mentioned.—C. W. S. Hartley.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated by giving a reference to the abstract.

1232 **Canada.** Report of the Minister of Agriculture for the year ending March 31, 1950. Ottawa, 1950, pp. 287.

INVESTIGATIONS REPORTED:

1. The effect of herbicidal oils on the physiological processes of plants, pp. 40-1.
2. Cereal rusts, smuts and foot diseases, pp. 54-9. Arasan, mixed with soil in green-house tests, at a concentration of 0.01 %, by weight gave a high degree of protection to cereals against common root rot (*Helminthosporium sativum*). Of 64 varieties of wheat tested, those with resistance to *H. sativum* were high in catalase activity, compared to non-resistant varieties. Among spring wheats tested, McMurachy's Selection was the most resistant to *H. sativum*; among durum wheats, Mindum and Ld. 303 (D.T. 204). Among oats tested, RL 1574 × Roxton, Victory and Garry selections were the most resistant.
3. Cereal seed treatments, p. 49. Ceresan M and Panogen 8 were outstanding in controlling bunt of wheat, covered smut of barley, *Helminthosporium* blight of oats and seedling blight of barley and flax.
4. Flax diseases, pp. 61-2. The bacterization of flax seed infested by *Colletotrichum linicola*, with 6 different bacteria antagonistic *in vitro* to *C. linicola*, materially reduced the percentage of diseased plants at seedling emergence.
5. Soyabean diseases, p. 69. Notes are given of work on brown stem-rot.
6. Sugar beet diseases, p. 70. Ceresan M and borax at rates of 2 and 5 lb. per ac. gave good control of black root of sugar beet seedlings. On black root infested plots, unthinned stands of sugar beet seedlings receiving fertilizer mixed with tetramethyl thiuram disulphide were 34 to 61 % greater than stands not receiving the fungicide.
7. The diagnosis of seed-borne diseases, p. 77. Bacteriophages specific for *Xanthomonas phaseoli* and *Pseudomonas phaseolicola* were isolated and successfully used in the diagnosis of infection with these pathogens in bean seeds.
8. Harvesting maturity tests for peas and maize, p. 84. Promising results were obtained in the establishment of a simple chemical test of maturity for harvesting, based on a colour change in boiled extracts of peas and beans treated with a silver salt.
9. Rutin in buckwheat (*Fagopyrum esculentum*), p. 84.
10. Chelate compounds as seed protectants, p. 90. The mercury complexes of cupferron and phenylthiohydantoic acid were better than Arasan in controlling damping off (*Pythium ultimum*) in radish seedlings.
11. Grasshopper control, pp. 91-2. Aldrin at 2 oz., or Dieldrin at 1 oz. per ac., were more effective than Chlordane at 8 oz. per ac.
12. Spring wheat breeding, pp. 145-7.
13. The status of new wheat varieties, pp. 147-8.
14. Oat investigations, pp. 148-50.
15. Field bean breeding, p. 150. A new early, high-yielding variety, Clipper, has been released.
16. Flax breeding, p. 150.
17. Winter wheat and barley investigations, pp. 151-3. Notes are given on Cornell 595 and Fairfield winter wheats. Three new barley varieties were licensed, Ottawa 3092 A (Velvet × Olli × O.A.C. 21 selection), a 6-rowed smooth-awned variety, and two US varieties, Compana (2-rowed, smooth-awned) and Velvon II (6-rowed, smooth-awned).
18. Chemical control of weeds in flax, pp. 155-6. Notes are given on 2,4-D applications.
19. The protein content of maize grain, pp. 170-1.
20. Improved fibre flax varieties, pp. 190-1. Stormont Gossamer L. 26 has out-yielded Stormont Cirrus, Liral Prince and Liral Dominion on the average by 38.2, 39.9 and 72.2 lb. per ac. over a 3-year period.—P.J.B.

1233 **Ottawa.** Central Experimental Farm. Division of Illustration Stations. Progress Report 1938-1947. Ottawa, 1950, pp. 85.

INVESTIGATIONS REPORTED:

1. Crop rotation studies in eastern Canada and

British Columbia, pp. 8-18. The rotations studied included two 3-year, five 4-year, five 5-year, four 6-year, one 8-year and one 10-year rotation. Notes are given on the value of two different types of rotation on certain farms and on crop adaptation.
2. Crop rotation studies in the Prairie Provinces, pp. 18-24. Rotations studied included three 4-year, five 5-year rotations, one 6-year rotation and long-term rotations on paired fields. Notes are given on the use of different rotations on the brown, dark brown, black, grey wooded and transitional types of soils.
3. Weed control studies on couch grass, (see Abs. 1129), wild oats, leafy spurge (*Euphorbia esula*) and hoary cress (*Lepidum draba*), pp. 25-8.
4. Strip farming and soil drift control, pp. 31-3.
5. The effect of depth of moist soil at seeding time on yields of wheat, pp. 33-5.
6. The effect of farm manure and various rates of chemical fertilizer on crop yields, pp. 36-7.
7. The effect of chemical fertilizers on the yield of cereal crops, pp. 40-3.
8. Tests of the regional adaptation of cereal varieties and strains, pp. 43-4.
9. Control of brown-heart in swedes, p. 49. Notes are given on the use of borax to control this disease.
10. Fibre flax production, pp. 55-6. Liral Prince, introduced from Ireland in 1944, has out-yielded all other fibre flax varieties tested. In manurial trials, 100 lb. per ac. of ammonium nitrate gave higher fibre and seed yields than any other treatment, its main value being that it stimulates early growth when soil conditions may be unfavourable.
11. Sugar beet investigations, pp. 59-61. Comparative sowing trials are reported in which ordinary seed, segmented seed and transplanted seedlings were used. Ordinary seed gave a root yield average of 8.13 tons per ac., with 16.5 % sugar; segmented seed, 7.68 tons per ac., with 15.7 % sugar, and transplanted seedlings 15.85 tons per ac., with 15.0 % sugar. The transplanted seedling roots had many fangs and a high earth tare.—P.J.B.

1234 **Illinois University** Agricultural Experiment Station. Report for 1948-1950. Urbana, 1951, pp. 104.

INVESTIGATIONS REPORTED:
1. Factors affecting the protein and oil content of maize, p. 25. Increasing the density of maize stands from 1 to 4 plants per hill resulted in a yield increase of 48 bu. per ac., but the protein content of plants sown at a density of 1 per hill was 9.9 %, compared to 7.8 % for those sown at a density of 4 per hill. Where 160 lb. N per ac. was applied, protein contents were 10.7 and 10.0 %, respectively.
2. Crop disease studies, p. 26. Soil-borne wheat mosaic disease is spreading in Illinois.
3. The performance of wheat varieties in relation to date of heading. By A. Alim, p. 31.
4. The concentration of certain nitrogen compounds in maize throughout the maturation period. By R. E. Hay, pp. 31-2. Studies with two maize hybrids showed that at maturity, the grain contained approx. two-thirds of the total N in the plant, of which approx. one-half was in the plant at the time of pollination, the remainder being taken from the roots and from continued uptake from the soil.
5. An agronomic and biochemical comparison of four strains of maize which differ widely in total grain nitrogen. By S. A. Watson, p. 34.
6. Studies of the influence of different borders on maize and soyabeans. By A. R. Hilst, p. 34. The mean yield of maize plots bordered by soyabeans was 111.9 bu. per ac., compared to 100.8 bu. per ac. for plots bordered by maize. The yield of soyabean plots bordered by soyabeans was 25.6 bu. per ac., compared to 24.6 bu. per ac. for plots bordered by maize.
7. Effects of nitrogen additions to field soils on nodulation, growth, yield and nitrogen content of the soyabean plant. By J. C. Lyons, p. 35.—P.J.B.

1235 **Mississippi.** Southern Weed Conference. Proceedings of the 3rd meeting. Biloxi, Mississippi, February, 1950. Biloxi, 1950, pp. 150. [Mimeographed]

For abstracts of papers reported in these Proceedings, see abstracts in the Weed Control section of this issue.—P.J.B.

1236 **New York.** North-eastern Weed Control Conference. Proceedings of the fifth annual meeting. New York, 1951, pp. 332. [Mimeographed] Proceedings of the fifth annual meeting. Supplement. New York, 1951, pp. 150. [Mimeographed]

For abstracts of papers read at this Conference, see section headed Weeds and Weed Control in the abstract section of this number.—P.J.B.

1237 **Texas** Agricultural Experiment Station. Agricultural Research in Texas, 1947-49. College Station, 1950, pp. 201.

INVESTIGATIONS REPORTED:
1. Sorghum grain drying, p. 21. The fastest and most economical rates of drying were obtained with 80 to 90 ft. per min. air velocity, through the grain column. The most efficient air temperatures for drying to 12 % moisture content were: 150°F. for grain with 14 to 16 % moisture, 175°F. for grain with 17 to 20 % moisture and 200°F. for grain with over 20 % moisture. The wet-milling characteristics of the grain were not impaired by drying over this temperature range.
2. Rice grain drying, p. 22. Test results showed that the following air temperatures had no adverse effect on germination: 140°F. for grain with up to 15 % moisture content, 125°F. for 15 to 20 %

moisture content and 120°F. for moisture contents above 20 %. For the highest milling yield of head rice, the following temperatures were best: 125°F. for grain with 15 % and less moisture content, 115°F. for 15 to 20 % moisture content and 105°F. for moisture contents above 20 %.

3. Groundnut drying, pp. 22-3. A barn drier installation and a portable air distribution system for drying groundnuts in the sack are briefly described.

4. Resistance of sorghum grain to air-flow in drying, p. 25.

5. Sorghum grain storage, pp. 25-6. Trials with a number of types of storage bins showed that storage of grain with 12 to 14 % moisture for 8 months reduced germination, while grain stored at a moisture content of 10 to 12 % for the same period of time, was not reduced in germination. Grain storage at temperatures of 100 to 110°F. for long periods reduced germination.

6. The storage of cotton seed for sowing, p. 26.

7. The resistance of cotton seed to air-flow in drying, p. 26.

8. Barley improvement, pp. 31-2. A mildew-resistant selection, No. 8-43-311 from Winter × Texan, has given high yields in north-central Texas. It is smooth-awned and winter-hardy. A strain 119 from a composite cross (Dryland × Peatland) × (Juliaea × Peatland) has shown promise for the extreme south of Texas. It is resistant to net blotch, leaf and stem rust. It is very susceptible to frost injury.

9. Maize improvement, pp. 32-3. A note is given of the new yellow hybrids Texas 24, 26 and 28.

10. Cotton improvement, pp. 33-6.

11. Seed flax improvement, pp. 37-8. A new variety, Turkey Winter has extended the flax area in Texas 200 to 300 miles further north than previously. It branches freely, has a low habit of growth during winter, is moderately late-maturing and winter-hardy.

12. Oat improvement, pp. 38-9. Mustang, a new variety, is approx. 20 % more winter-hardy than the standard Red Rustproof varieties. It is very winter-hardy, resistant to crown rust, moderately susceptible to *Helminthosporium* blight and susceptible to stem rust. It is well fitted for winter grazing.

13. Groundnut improvement, pp. 39-40. A note is given on Spantex, a White Spanish selection.

14. Rice improvement, pp. 40-1.

15. Sorghum improvement, pp. 42-4. The release of a number of new varieties is noted, including Combine Kafir-60, Redbine-60 and Redbine-66. Combine Kafir-60 is a new, early-maturing, double-dwarf Blackhul Kafir type with a high yield and particularly dry head-stem characters and is well adapted to combining.

16. Wheat improvement, pp. 45-6. A new, hard red winter wheat variety, Quanah, has been released to farmers. It is resistant to stem rust and bunt, moderately resistant to leaf rust, and has excellent milling and baking qualities.

17. Legumes as green manure for cotton, p. 60. Cotton yielded 452 lb. per ac. of lint following hairy vetch (*Vicia villosa*) ploughed under, a significantly higher yield than that following Williamette vetch (*Vicia sativa*), or that of cotton manured with 60-80-80 (NPK) or 0-80-80 [rate of application not stated].

18. The use of Chinese Red cowpeas for green manure, pp. 61-2.

19. Manurial treatments for rice, pp. 64-5. See Abs. 725.

20. Weed control trials, pp. 72-4. Results during several seasons showed that 0.5 lb. per ac. of 2,4-D amine salt applied to 5- to 8-week-old rice, or 1 lb. per ac. applied to more mature rice, actively controlled growing weeds. Pre-emergence treatment of rice with 2 and 3 lb. per ac. of 2,4-D or 2,4,5-T severely injured rice stands. Over a wide range of conditions, Johnson grass (*Sorghum halepense*) was controlled on irrigation canal banks by 160 gal. per ac. of a mixture of 70 gal. water, 30 gal. burner oil, 2 qt. of 20 % pentachlorphenol solution and 1 pt. of Triton X-100 (a wetting agent).

21. Cotton insect control, pp. 116-17. Dusts of 20 % toxaphene-sulphur, or 30 % gamma isomer BHC-5 % DDT-sulphur proved effective against almost all cotton pests. Toxaphene-DDT and toxaphene spray emulsions applied at a spray pressure of 60 lb. per sq. in. at 7.5 gal. per ac. gave fair boil weevil control and excellent bollworm control.

22. Corn earworm control, pp. 118-9.

23. Seed treatments for rice, pp. 144-5. Seed of Bluebonnet and Rexoro was treated with 1 oz. per bu. of Spergon, Cuprocide, Dow 9B and 0.5 oz. per bu. of Ceresan M. Except for slight injury caused by Dow 9B to Rexoro, there were no significant differences in seedling emergence between the different treatments. All gave good seed protection and no injury to seed was caused by storage for 4 to 5 months following treatment.

24. Blight-resistant cotton, pp. 146-8.—P.J.B.

1238 **Jamaica** Department of Agriculture. Investigations 1948-1949. Bull. No. 45. N.S. Kingston, 1950, pp. 110.

INVESTIGATIONS REPORTED:

1. Variety trial of local food crops, p. 37.

2. Maize variety trials, p. 38, The varieties JSY, RVTM, and MJ are being compared.

3. Rice variety trials, p. 38.

4. Introduction of fibre crops, pp. 38-9.

5. Introduction and trials of oil crops, pp. 39-41. Manchurian Giant sunflower was unsatisfactory. The linseed varieties Punjab, Royal and Rio were failures. Groundnut trials are in progress.

6. Yam fertilizer trial, pp. 44-5.

7. Soyabean variety trials, pp. 47-8.—N.G.S.

1239 **El Salvador.** Centro Nacional de Agronomía. Informe de los anos 1944-8. [Report for 1944-8.] San Salvador, 1949, pp. 71, bibl. 50, illus. [Received 1951]

1240 **El Salvador.** Informe de las labores del Centro Nacional de Agronomía durante e año de 1949. [Report of the work of the Centro Nacional de Agronomia for 1949.] San Salvador, 1950, pp. 95, bibl. 13, illus. [Received 1951]

INVESTIGATIONS REPORTED:

1. Preparation of ground for maize, p. 21.
2. Maize variety trials, p. 22. The best crosses were Ulupilsen × Venezuela 1, Empalizada × Venezuela 3, Cuban PD (MS) 6 × Miraflores, and Hernández × Miraflores.
3. Time of green manuring maize, p. 23. *Canavalia ensiformis* was used. Highest yields of maize were obtained when the green manure was ploughed in on December 8th. At this time the earth was dry dust.
4. Maize fertilizer trials, pp. 23-4. The best treatment at Santa Cruz was 50 lb. N and 60 lb. P per acre, and at San Andrés 30 lb. N and 60 lb. P per acre.
5. Green manure for maize, pp. 24-5. Highest yields were obtained after *Canavalia ensiformis*.
6. Sorghum variety trials, pp. 25-6. Shallu Agros 2650 gave much the highest yields.
7. Rice variety trials, p. 26. Fortuna yielded most, closely followed by Nira.
8. Rice fertilizer trials, pp. 26-7.
9. Cotton variety trials, p. 29. Empire Wilt gave the highest yields.
10. Cotton spacing trials, pp. 29-30. Optimum spacing was 12 in. between hills with 1 plant per hill.
11. Bean variety trials, pp. 39-40.
12. Sesame variety trials, p. 49. Of 23 varieties tested, the best were Venezuela 51, China Yellow, China White No. 1, and Indian White No. 2.
13. Sesame sowing date, pp. 49-50. The optimum sowing month for Venezuela 51 and Criolla was June.
14. Sesame variety trials, p. 50. Venezuela 51 yielded more than Venezuela 52, Local, or Caribe.
15. Sesame spacing trials, pp. 50-1. Venezuela 51 and Local were sown at intervals of 0.20, 0.40, 0.60 and 0.90 m. between rows. Highest yields were obtained from the 0.20 m. spacing.
16. Soyabean sowing date, p. 57. The optimum sowing date for the variety Nanda was between the second and third weeks of August, and for Otootan, which gave much higher yields, July 26th (the first sowing tried).
17. Soil conservation, pp. 59-65. Experiments were carried out with 3, 4 and 5 year rotations, with vegetative barriers, terraces and cover crops.—N.G.S.

1241 **Argentina.** Dirección General de Fomento Agrícola en el año 1949. [Work of the Dirección General de Fomento Agrícola in 1949.] *Bol. Prod. Fom. Agric.* 1950, **11**, 11-30

See Abs. 616.

1242 **Argentina.** Ministerio de Agricultura y Ganaderia. Dirección General de Investigaciones Agricolas. Memoria de la quinta reunion de maiz, en la Estacion Experimental Pergamino. 1950. [Report of the 5th maize conference, at Pergamino Exptl Sta.] 1950. Pergamino, 1950, pp. 213. [Mimeographed]

Papers presented at this conference are reported in the section headed Maize and in Abs. 1151.

1243 **Hong Kong.** Annual Report by the Senior Agricultural Officer for the year ended the 31st March, 1950. [n.d.], pp. 31.

1244 **Malaya,** Federation of. Annual Report of the Department of Agriculture for the year 1949. Kuala Lumpur, 1951, pp. 87, maps 1.

INVESTIGATIONS REPORTED:

1. Wet padi variety trial, pp. 23-4.
2. Wet padi sowing trial, p. 25. A satisfactory stand was obtained by broadcasting seed. Best results were obtained by soaking and germinating the seed before sowing it in clean water 2 in. deep.
3. Padi pot fertilizer trials, pp. 26-7.
4. Trace elements and rice fertilizing, p. 27.
5. Field manurial experiments on rice, p. 27.
6. Dry padi variety trials, p. 28. The highest yield was obtained from Muar Pergau, which was not, however, significantly higher than that from Muar Pa Dok in 1948.
7. Mechanized cultivation, pp. 28-9. Disc harrows and disc ploughs were shown capable of producing a satisfactory seed bed on peat, and standard seed drills sowed seed satisfactorily when their wheel width was increased. At Melor Agricultural Station, Kelantan, dry padi reacted more to deep cultivation than wet padi. Deep ploughing gave a 50 % increased yield over the standard practice.
8. Off-season cultivation, p. 30. An off-season crop of Taiwan padi was obtained in Province Wellesley and Malacca, without significantly decreasing the main crop.
9. Blast of rice, p. 30. At Kuala Lumpur, Bordeaux mixture, Perenox, Spersul, Shell Copper Fungicide, and Shell Copper Fungicide with white oil all gave partial control of blast (*Piricularia oryzae*) when sprayed on the crop at intervals of four days. [Duration of period of spraying and strength of sprays not stated.]
10. Insect pests of rice, pp. 31-3. In laboratory tests, 0.1 % Parathion gave a 57 % kill of stem borers. 2 % TEPP gave a 29 % kill of stem borers (mainly *Schoenobius incertellus*) but when a further

treatment of 0.1 % TEPP was given, a kill of 76 % was obtained after two weeks. Other experiments in control of stem borers are in progress. Applications of DDT at 20 lb. per ac. gave fair control of the leaf hoppers *Sogata furcifera* and *Nephotettix bipunctatus*.

11. Soyabean trials, pp. 56-7.
12. Cassava trials, p. 58.
13. Maize trials, pp. 58-9. The highest yields were obtained from the hybrids Burma White and Burma Yellow. Trials for the control of stalk borer (*Pyrausta* sp.) with Wettable DDT, 5 % DDT dust and Agrocide 3 dust are in progress.
14. Groundnuts, p. 59. There was no advantage in planting on raised beds as against planting on the level, except where water-logging was likely to occur. The optimum spacing was found to be 12 × 12 in. Lime, up to 30 cwt. per acre, increased the yield on dry soils.
15. Weed control, p. 60.—N.G.S.

1245 **India.** Annual Administration Report of the Department of Agriculture, Uttar Pradesh, for the year ending June 30, 1949. Allahabad, 1950, pp. 125. [Received 1951]

1246 **Cyprus.** Quarterly Review No. 24, 1st Jan.-31st March, 1951. Nicosia, 1951, pp. 19.

INVESTIGATIONS REPORTED :

1. Weed control in cereals, p. 3. 4 % 2,4-D dust applied at 5 okes per donum [23 lb. per acre] effectively controlled charlock (*Brassica arvensis*) in the young stages ; *Chyrsanthemum* and *Galium* spp. were checked to a lesser extent, whilst *Fumaria* and *Convolvulus* spp. were least affected.
2. Herbicides, p. 10. See Abs. 1160.
3. Hybrid maize trials, p. 10.
4. Sorghum trials, p. 10.
5. Soyabean trials, p. 11.
6. Cereal trials, p. 11. The Australian wheat Gabo, shows promise. It is resistant to brown rust (*Puccinia triticina*), but very susceptible to yellow rust (*P. glumarum*).—N.G.S.

1247 **Austria.** Bundesanstalt für alpine Landwirtschaft in Admont. Bericht über die Tätigkeit im Jahre 1948. [Report of activities of the State Institute for Alpine Agriculture, Admont, for the year 1948.] Published in *Veröff. Bundesanst. alp. Landw., Admont* 1950, No. 3, pp. 1-97.

INVESTIGATIONS REPORTED :

1. Report on cereal cultivation. By R. Pfeiffer, pp. 19-40. Much of this section of the report is tabulated information, chiefly for the plant breeder, on summer and winter varieties of barley, wheat and rye, and on varieties of oats and maize. For control of weeds in cereals the English herbicide Phenoxylen has been tried. Perennial weeds were only temporarily checked, but sufficiently to give a start to the cereals. Phenoxylen was successful against annual weeds, especially *Galeopsis* (one of the worst cereal weeds of alpine situations), *Raphanus raphanistrum* and *Atriplex*. The herbicide should be applied before the cereal crop stands higher than the weeds, otherwise the herbicide is intercepted by the cereal leaves. The cereal crop was not damaged by the herbicide.
2. Report on arable crops and oil-bearing crops. By G. Jähnl, pp. 40-56.
   a. Sugar-beet trials, pp. 50-3.
   b. Oil crops, pp. 53-6. Varietal trials with poppy, sunflower, flax, rape. turnip and hemp. Of these, poppy is the most important.—D.B.

1248 **Finland,** Hankkija's Plant Breeding Station, Tammisto. Hankkijan harjoittaman jalostustyön tuloksia 1946-49. [Results of plant breeding work by Hankkija, 1946-49.] *Siemenjulkaisu*, 1950, 17-18, English summary p. 18.

The results of comparative field trials (which include those of spring wheat and oats) during 1946-9 at Hankkija's Plant Breeding Station at Tammisto, and its branch, the Hankkija Experimental Farm at Anttila, are reported.—From summary.

NEWS ITEMS AND NOTES

France

1249 MAIZE CONFERENCE. Experts from various countries belonging to FAO, met at Clermont-Ferrand in Jan., 1951, to study the results obtained in western Europe and North Africa with first generation maize hybrids. A brief account was given of maize research in the USA. Particular points examined were : international exchange of maize material ; male sterility with regard to the technique of hybrid production ; resistance to *Pyrausta nubilalis* ; trials on plant density, manuring and irrigation ; seed drying and treatment ; low temperature germination trials ; maize for fodder and silage ; effect of topping maize plants for fodder on grain yield. *Agron. trop.* March—April, 1951.—E.B.

Persia

1250 LOCUSTS. An outbreak of desert locusts over an area of about 130,000 square miles was reported in June. An egg-bed of 1600 square miles was also reported, where locusts were beginning to hatch. Shipments of Agrocide and Aldrin were sent to help combat the threat. Aldrin was applied from the air in the semi-desert country south-east of Abadan. A 95 % kill, including even the oldest nymphs, was observed within 24-48 hrs. The first application was at the rate of 3 oz. per acre, this being subsequently reduced to the standard US rate of 2 oz. per acre. *World Crops* June and July, 1951.—N.G.S.

India

1251 WEIGHTS AND MEASURES. The special committee set up by the Indian Standards Institutions has recommended the adoption of the metric system for India. The report proposes that the change-over should be spread over a period of 15 years, and that international, not Indianized, nomenclature should be used. *Indian Fmg* August, 1950.—N.G.S.

1252 TERMINOLOGY. A committee has been set up under the chairmanship of Mr. K. M. Munshi, the Minister of Food and Agriculture, to translate English agricultural terms into suitable simple Hindi. This is in accordance with the principle of developing Hindi as a national language. *Indian Fmg* August, 1950.—N.G.S.

Portugal

1253 SEED EXCHANGE. The Estação Agrónomica Nacional, Sacavém, Portugal in its 1951 ***Index Seminum*** offers various seed for exchange. This index includes 66 varieties of rice, 189 of wheat, 18 of maize, 25 of soyabeans, and 29 of *Linum usitatissimum*. Many other plants are offered, including some 40 spp. of Graminae and 14 legumes.—N.G.S.

South America

1254 SECOND SOUTH AMERICAN BOTANICAL CONGRESS. The Proceedings of this Congress, held at Tucuman, Argentina, in October, 1948, have now appeared in the periodical *Lilloa* Vols. 15 to 21 inclusive, Tucuman, 1948-1949, received 1951. Individual papers are reviewed elsewhere in this journal.—G.M.R.

USA

1255 THE NEW STEM RUST THREAT. During 1950, the losses caused, in durum wheats alone, by Race 15-B of stem rust in the USA amounted to an estimated 10 million bushels, representing a fifth part of the total yield. Race 15-B is the most virulent stem rust race yet encountered in N. America. It has been known to exist on barberry plants since 1939, but was never found in commercial wheat fields until the summer of 1950, when it suddenly appeared in 15 States from Texas to Manitoba and from Idaho to Ohio. No wheat variety now grown commercially has resistance to this race of stem rust. Renewed efforts are in progress to eliminate barberry, an essential link in the life cycle of the pathogen. A further reason for eliminating barberry plants is the fact that strains of the fungus hybridize on this plant, thus producing new races. Wheat breeders all over N. America are testing wheat breeding material for resistance to Race 15-B. Several sources of resistance have been found in the World Collection of Wheats, among introductions from Kenya and Egypt, but so far none of these varieties is suitable for commercial growing in the USA. There is little doubt, say the authors, that wheats resistant to Race 15-B will be developed in the relatively near future, but what will happen to next year's crop is uncertain. Much depends on the build-up of inoculum in southern Texas. ***Science*** May, 1951.—P.J.B.

USSR

1256 COLLECTIVE FARMS. Kolkhozy (collective farms) are being merged to form larger units. This policy, which began in the north-western and north-central regions, has spread throughout the Soviet Union and is a reversal of the policy adopted in the 1930's, when large kolkhozy were divided to obtain greater efficiency. During 1950, as a result of mergers, the number of kolkhozy decreased from 252,000 to 123,000. There are indications that the ultimate object is to integrate the kolkhozy with the state farms on the socialist pattern of the latter. It is questioned, however, whether the policy of substituting wages for the " workday " system would be acceptable. These mergers also entail the resettlement of collective farmers, and have been accompanied by intensive construction activity. The reversal of policy, the disregard of economic limitations of farm size, wide regional variations in natural conditions and types of farming within the merged kolhkozy, the divorce of the peasantry from ancestral lands and the suggestion that garden plots should be limited to a very small size (the remaining land entitlements being communally machine-cultivated), are believed by the author to demonstrate the imposition of tighter political control over Soviet peasant agriculture. L. Volin in *Foreign Agriculture* May, 1951.—N.G.S.

West Indies

1257 AGRICULTURAL DEVELOPMENT. Four major agricultural developments are noted in the 1950 report on Development and Welfare in the West Indies [HMSO, Col. No. 269, 4s. 6d.] 1. Approval has been given to the establishment of a large-scale agricultural experimental station on the Centeno estate, Trinidad which has already been acquired by the Trinidad Government. The chief aims of this station will be the development of a stable agricultural system based on mixed farming, investigations into crop yields with a view to improving the status of the local agricultural worker, and implementing pilot schemes to test methods of organization. 2. A Farm Institute is proposed for the East Caribbean, and has been approved by all concerned except Barbados and British Guiana. 3. The West Indian Conference recommended to the Caribbean Commission that pilot land improvement projects be set up in St. Lucia and St. Vincent, which have been selected as typical of the greater part of the Caribbean, and the appointment of a grass-legume expert and a live-stock expert under the United States " Point Four " programme. 4. Peasant holding investigations are being carried out at the Imperial College of Tropical Agriculture, Trinidad, to obtain information on the economics of small scale holdings.—N.G.S.

ANNUAL SUBJECT INDEX VOL. 4, 1951

References are to abstract numbers.

Aagrano, 336
Abavit, 1034
Absorption of radioactive 2,4-DI by beans, 118
Absorption of 2,4-D, 885
Abutilon
  varieties
    Manjčžurskiĭ....465
    07....465
    085....465
    091....465
    452....465
A. theophrasti, 541, 842
Acacia aphis, 1050
Acanthospermum hispidum, 1128
Actidione, 671
Adesmia, 263
Advisory services, 270
Aerial fertilizing of rice, 292
Aerial sowing of rice, 292
Aerial spraying, 622
  of maize, 61
Aerial weed killing, 85
Aeschynomone indica, 839
Africa
  cotton pests, 452
  crop origins, 900
  mechanization of agriculture, 935
  rice, 721
  Scientific Council, 285
Agelaius ruficapillus, 1024
Ageratum conyzoides, 215
Agrano, 377
Agrarian reform in Italy, 290
Agricultural bibliography for S. Rhodesia, 902
Agricultural development in Nigeria, 636
Agricultural development in West Indies, 1257
Agricultural ecology in Venezuela, 261
Agricultural economy of Chibia, Angola, 475
Agricultural education of Africa peasant farmers, 185
Agricultural improvement scheme in the Belgian Congo, 186
Agricultural mechanization in Angola, 488
Agricultural meteorology, 597
Agricultural practices in the Belgian Congo, 175, 176
Agricultural research, 564
  in Fiji, 258
  in French West Africa, 1213
  in Great Britain, 1229
Agricultural statistics in Hungary, 904
Agricultural terminology in India, 1252
Agriculture
  in Belgian Congo, 174
  in Colombia, 1230
  in Fiji, 1113
  in Greece, 1111
  in Holland, 1123
  in Italy, 260
  in Mauritius, 477
  in Morocco, 613
  in Persia, 630
  in Scotland, 472
  in Union of S. Africa, 819
  in Yemen, 181
Agrocide, 1250
Agrocide 3, 1244
Agromyza phaseoli, 99
Agronomic control of *Loxostege*, 196
Agronomic control of take-all, 22
Agropyron x *Triticum*, 308
A. repens, 623, 625, 832, 928, 1129, 1138
Agrosan, 597
Agrosan GN, 377, 1034, 1035
Agrostis spica-venti, 675
A. ypsilon, 1060
Agroxone, 599, 604, 1156, 1171
Agroxone ICI, 511
Aircraft and agriculture in Australia, 899
Air, nutrient content, 254
Air pollution and plant injury 576
Alabama argillacea, 1085
Alanine, 246
Aldrin, 358, 359, 930, 1232, 1250
Aleurone grains in *Linum* and *Ricinus*, 869
Algaecides
  and rice, 391
  copper sulphate, 379, 836
Algeria
  cotton, 778
  maize, 51
Alligator weed, 497
Alopecurus fulvus, 841
α-(parachlorophenoxy) isobutyric acid, 660
α-3-indole-isobutyric acid, 660
Alternanthera philoxeroides, 497
A. sessilis, 215
Alternaria lini, 808
Altitude
  and plant development, 323
  and yield of maize, 627
Alysicarpus, 599
A. vaginalis, 825
Amaranths, 813
Amaranthus chlorostachys, 196
A. hybridus var. *quitensis*, 1151
A. retroflexus, 1147, 1163
A. spinosus, 355
Ambrosia artemisifolia, 604
A. trifida, 842
American bollworm of cotton, 452, 590
Amino acids in maize grain, 704
Ammonia dinitro-secondary-butylphenate, 1148
Ammonium nitrate
  on barley, 627
  on soyabeans, 405
  on sugar beet, 627
Ammonium phosphate on barley and sugar beet, 627
Ammonium sulphate
  on cotton, 448
  on rice, 375
Ammonium thiocyanate, 925
Ancient Egyptian barley and wheat 741
Andropogoneae, 274
Andropogon halepensis, 72
A. sorghum, 597
  mixed cropping, 481
Aneurin in wheat, 522
Anfistemonia, 1175
Angola
  agricultural economy of Chibia, 475
  agricultural mechanization, 488
  climate, 1215
  economic plants, 517
  local plant names, 1179
  maize, 1010
  plant improvement work, 581
Annual Reports—see Reports,
Anthemis, 509
Anthonomus grandis, 454, 1085
Anthracnose, 787
Anti-auxins and wheat root growth, 660
Anti-biotics, 1191
Antibiotic XG, 109
Anticarsia gemmatilis, 747
Anticryptogamic preparations, 1048
Anti-thiamine factor in mustard, 1198
Aonidimytilus albus, 444
Aphanomyces cochlioides, 279, 628
Aphids, 113, 130, 430, 1064
  of cotton, 452, 619
Aphis fabae, 114, 130, 768
A. gossypii, 452, 454, 1085
Apis melifera, 1089
Arachis, 1050
A. hypogaea—see Groundnuts
A. rasteiro, 101
Arasan, 621, 628, 696, 910, 931, 932, 1045, 1232
Arasan S. F., 256, 932
Arasan 45, 1035
Argentina
  agricultural improvement in 1949, 616
  bibliography of plant chemistry, 1176
  climates, 1216
  Dir. Gen. Fom. Agric. Rep. 1949, 1241
  5th Maize Conference Rep. 1950, 1242
  flax production, 460
  hemp, 158
  Hibiscus esculentus, 938
  rye, 342
  sugar beet trials, 129
  teasel, 1109
  Tucumán Agric. Expt Sta. Rep. 1947, 615
  weeds, 1141
  wheat varieties, 5
Arginine, 703
Argyria sticticraspis, 385
Aristida stipoides, 825
Armyworm, 277, 920
Arsenic absorption by plants, 855
Arsenic pentoxide, 912
Artemisia sp., 837
A. vulgaris, 511
Artificial drying of rice, 88
Asclepias syriaca, 1147
Ascochyta pisi, 109
Ascorbic acid
  and chemical content of rye, 673
  and germination, 30
  and photosynthesis, 30
  and respiration, 30

  and soyabeans, 1047
  content of rye, 672
  oxidation in rape root tissue, 246
Aseptic cultivation of higher plants, 895
Aspartic acid, 246
Assimilan, 858
Atlantic mite, 792
Atomic research and farming, 1178
Atriplex, 1247
A. cana, 857
A. nummularium, 326
A. patula, 214, 501
A. semibaccata, 326
Aumentan, 655
Australia
  aircraft and agriculture, 899
  analogous climates in S. America, 263
  cereals, 4
  Comm. Sci. Industr. Res. Organ. Ann. Rep. 1949, 592
  cotton harvesting, 152
  Counc. Sci. Industr. Res. Ann. Rep. 1948, 591
  Counc. Sci. Industr. Res. Organ. Ann. Rep. 1950, 923
  cowpeas, 96
  erosion control, 491
  green manure seed, 96
  reclamation of eroded arable, (N.S.W.), 209
  rice production, 173, 1020
  salt land, 326
  sorghum scheme, 286
  weed control in Queensland, 225
Austria
  farming systems, 820
  State Inst. for Alpine Agric., Admont, 1948, 1247
Auxins
  and induction of lateral pea roots, 551
  and wheat root growth, 660
  influence of water regime, 545
Availability of plant foods, 588
Avena byzantina, 970—see also Oats
A. fatua, 338, 830, 973—see also Wild oats
  in cereals, 495
A. ludoviciana, 973—see also Wild oats
A. sativa, 1202—see also Oats
A. strigosa, 970
Axonopus affinis, 604
Bacillomycin, 1191
Bacillus radicicola, 419
B. subtilis, 1191
Bacterial blight of beans, 626
Bacterial blight of cotton, 590
Bacterial equilibrium, 588
Bacteriosis of maize, 1001
Bacterium malvacearum, 590
B. radicola symbiosis with *Vicia faba*, 119
B. solanacearum, 102
Bambarra groundnut, 612—see also *Voandzeia subterranea*
  interplanted in maize, 482
Banana diffusates and excised pea root growth, 556
Barberry, 670, 1255
Barium chloride, 1063
Barleria prionitis, 604
Barley, 674, 675, 933
  ammonium nitrate, 627
  ammonium phosphate, 627
  ancient Egyptian, 741
  and 2,4-D, 1159
  as cover for sugar beet, 429
  BHC, 250, 562
  bibliography, 685
  biological control of loose smut, 345
  bluegrass billbug, 319
  boron, 523
  breeding, 327, 620
  carbonic anhydrase content, 237
  classification, 681
  coleoptile length, 682
  covered smut, 671, 1232
  DDT, 580
  disease resistance, 48, 49, 276, 980, 1237
  drying in the field, 676, 933
  fertilizer, 347, 398, 736
  fertilizer placement, 276
  grasshoppers, 981
  growth of excised roots, 554
  hormone herbicides, 224
  in France, 977
  in North Africa, 473
  in Scotland, 472
  in Tibetan Uplands, 681
  isopropyl n-phenyl-carbamate, 559
  leaf rust, 678
  location, 622
  lodging, 625
  loose smut, 933
  maleic hydrazide, 889
  mechanical counting of seed, 257
  mildew, 625
  mixed cropping, 481
  mixed with oats, 268
  multi-flowered spikelets, 346
  net blotch, 622
  nitrogen metabolism, 683
  nitrogenous fertilizer trials, 46
  nutritive value of straw, 735
  on Australian salt land, 326
  origins, 681
  pest control in storage, 933
  phenoxyacetic acid, 559
  place in farming system, 192
  potash, 589
  potassium absorption of roots, 684
  powdery mildew, 678, 980
  protein content, 622
  Rhynchosporium scald, 980
  root production, 247
  salt, 589
  seed rate, 932
  seed treatment, 336, 671, 1034, 1036
  seedling blight, 1232
  sodium arsenate, 855
  soil temperature and development, 1193
  sowing date and disease resistance, 18
  spot blotch, 622
  sterility, 397
  Stipa disease, 622
  stripe, 336, 980
  Syringopais temperatella, 509
  treble superphosphate, 627
  trials, 597
  2,4-D 627
  varieties, 17, 38, 269, 279, 469, 570, 596, 618, 622, 627, 677, 918, 969, 977, 1030, 1247
    Abed Maja....343
    Agio....933
    Agio C.B.....933
    Alfa....343
    Arctic....48
    Atlas....980
    Atlas 46....980
    Aurore....679
    Balder....46, 679, 933, 978
    Barboff....268
    Binder....978
    Buck II....35
    Buck III....33, 36
    Byng....268, 927
    Camton....3
    Carée de Printemps Escourgeans, I.F. 3158....49
    Carlsberg....46, 343, 679, 933
    Charlottetown....927
    Cheg 176 × 112....34
    Cheg 202 × (13) 12....34
    Colonial....678
    Compana....1232
    Davidson....678
    Dørum....680
    Dryland × Peatland....1237
    Earl....3
    Edda....680
    Fløya....680
    Fong Tien....49
    Freja....3
    Galore....268
    Glabron 2073....49
    Glacier....981
    Golden Archer....3
    Greenough....326
    Haisa....933
    Haisa Neu....679
    Harbine....949, 979
    Heimdal....933
    Hen Gymro....918
    Herta....344, 679, 933, 978
    Hybrid 202 × (Stadler R.40 × Orel)....34
    Hylkema....933
    Hylkema 336/362....46
    Jotun....680
    Juliaca × Peatland....1237
    Kenia....3, 46, 679, 933
    Kindred....47, 48, 622
    Kindred C.1. 6969....49
    La Previsión 13....37
    La Previsión 19....35, 36
    Lenta....46, 343, 933
    M × Kj 573....680
    Maja....3
    Maltería Heda....35
    Manchuria....47
    Mansholt's two-rowed....933
    Mars....47, 48
    Maskin....680
    Massaux E.M.....35, 37
    Michigan Winter....979
    Montcalm....47, 48, 268, 622
    Moore....47, 625
    Newal....926, 981
    Nova....46
    OAC....926
    OAC-21....47, 49, 268, 981
    Odessa....47, 48
    Olli, 926, 927, 982
    Ottawa 3092A....1232
    Pajbjerg Drot....343
    Peatland....47
    Pillsburg....48
    Plumage-Archer....3, 45
    Plush....268, 926, 981
    Primor × Trebi F.C.S.....35

    Regal....981
    Rex....981
    Rigel....218, 343, 978
    Rika....344
    Saxonia....933
    Selecta....46, 933
    Sølen....680
    South Dakota B.....48
    Spratt-Archer....3, 45
    Strain 119....1237
    Sunrise 2989....678
    Svalöf Freja....343
    Svalöf Ymer....343
    Tammi....978
    Tenkow....949, 979
    Texan....1237
    Titan....981
    Trebi....48, 981
    Trebi Sel. Klein....33, 35, 37
    Tregal....47, 622
    Vantage....48
    Varde....680
    Velvon II....1232
    Ward....949, 979
    Weibull's 4744....46
    Weibull's 4994....679
    Winter....1237
    Wis.-38....47
    Wisconsin Red 38....268
    Wisconsin Winter....49
    8-34-311....1237
    177 × 642....34
  water requirements, 44
  weeds, 675
  yields, 728
Barnyard grass, 292
Barsprout, 932
Bassia linchii, 591
Basutoland Dept Agric. Ann. Rep. 1949, 605
Bathurst burr, 591
Beans, 115, 244—see also under specific names
  absorption of radioactive 2,4-DI, 118
  after tobacco, 608
  aphis infestation and wind direction, 114
  bacterial blight, 626
  BHC, 250
  black aphis, 416
  blight, 627
  chocolate spot, 416
  constant cropping, 627
  detection of internal diseases in seed, 115
  disease resistance, 276
  diseases, 281
  flower thrip, 117
  growth inhibition, 887
  Heliothis armigera, 577
  in rotation, 265
  intercropping in maize, 983
  intercropping with tung, 608
  interplanted in maize, 482
  maleic hydrazide, 889
  manuring, 416
  mineral deficiencies, 471
  mixed with oats, 416
  mixed with peas, 416
  molybdenum, 595
  mound cultivation, 482
  NPK, 416
  penetration of 2,4-D in seed, 842
  rust, 627
  seed rate, 589
  seed treatment, 276, 626, 910
  sheller, 107
  stem rot, 416
  translocation of radioactive 2,4-DI, 118
  treatment of seed against aphids, 113
  varieties, 108, 589, 1240
    Banja....609
    Black Valentine....887, 1166
    Canadian Wonder....609
    Clipper....1232
    Mutike 4....609
  vernalization, 797
  vitamin C distribution in radicle tip, 879
  weevil, 116, 416
  white mould, 627
Beet eelworm, 434
Beet flea, 769
Beet leaf bug, 770
Beetroot, 326
Beet rust, 281
Behmisina, 655
Belgian Congo
  agricultural improvement scheme, 186
  agricultural practices, 175, 176
  agriculture, 174
  cotton, 781, 784
  flora, 582
  improvement of native agriculture, 170
  INÉAC Ann. Rep. 1949, 612
  Phaseolus vulgaris, 754
  soil conservation, 203
Belgium
  seed exchange, 631
  soyabeans, 402
Bemisia nigeriensis, 446
Beniseed, in Nigeria, 636
Bentonite powder, 216
Beta vulgaris—see Sugar beet
BHC, 63, 80, 81, 99, 117, 146, 156, 196, 250, 281, 383, 386, 435, 509, 578, 732, 912, 920, 930, 931, 932, 1037, 1203, 1085, 1222, 1237
  and plant development, 562
Bibliography
  of barley, 685
  of mineral nutrition, 1181
  of plant chemistry, 1176
  of Swaziland, 903
B-(indole-3)-propionic acid, 890
Bindweed, 509
Bioclimatology project in Morocco, 613
Biological control of loose smut, 345
Bioquin I, 256
Biosynthesis of vitamin C during germination, 534
Bird damage to rice, 173, 1024
Bird damage to sorghum, 72
Bis anhydride, 113
Bis dimethylamine phosphonous anhydride, 130
Bisexual inflorescence in maize, 520
Bitter seeds of yellow sweet lupin, 417
Black aphis of beans, 416
Blackarm of cotton, 590
Blackberry, 591
Black root of sugar beet, 628, 1232
Black rust of oats, 670
Black stem rust of wheat,
Bladderwort, 836
Blast of rice, 382, 1244
Blending, 416
Blight of beans, 627
Blight of rice, 382
Blindness in oats, 42
Blister beetle, 747, 930
Blood plasma substitute, 938
Bluegrass billbug, 319
Blue rays and leaf composition, 531
B-naphthoxy acetic acid, 890
Bolivia, wheat, 14
Boll weevil, 283
  of cotton, 278, 454, 619, 1237
Bollworm of cotton, 454, 1237
Borax, 1232
Bordeaux mixture, 1244
Boron, 861
  and barley, 523
  and buckwheat, 231
  and *Hibiscus cannabinus*, 523
  and Japanese barnyard millet, 523
  and legume growth, 418
  and sugar beet, 773
  and flax, 231
  deficiencies, 471, 588
  in Chile saltpetre, 848
  mineral absorption from soil, 231
Borreria latifolia, 215
Borweed, 1171
Botrytis cinerea, 808
Brachiaria spp., 1147
B. deflexa var. *sativa*, 727
Brassica arvensis, 1246
B. campestris, 847
B. campestris var. *oleifera*—see Rape
B. crenata, 540
B. juncea, 847
B. napus, 847, 861, —see also Rape
B. nigra, 847
B. oleracea, 847
B. rapa, 847—see also Turnip
B. rapa annua oleifera, 809
B. sinapis, 1160
Brassicas, identification, 519
Brazil
  cotton, 144, 259
  cotton pests, 453, 789
  erosion control, 1125
Britain, qualitative control of seeds, 934
British Africa, land utilization, 919
British Commonwealth, Specialist Conference in Agriculture 1949, 588
British East Africa, mechanical cultivation of groundnuts 1950, 749
British Guiana
  Dept Agric. Ann. Rep. 1949, 610
  Mahaicony/Abari Rice Scheme, 266
Broom corn, 363
Broom, for fibre, 803
Brown heart in swedes, 1233
Brown heart in swedes and turnips, 441
Brown stem rot of soyabean, 1232
Brown streak of cassava, 920
Brown rust of wheat, 1246
Bruchid beetle, 446
Bruchus obtectus, 116, 612, 754
Buckwheat
  and boron, copper and cobalt, 231
  hybrid seeds, 328
  NPK, 330
  rutin, 1232
  seed treatment, 966
  varieties
    Bogatyrj....329

    Gornolesnaja....965
    Kazanskaja....329
    Orlovskaja-2....329
    Skorospelaja-3....329
Bulrush millet, 590
Bunt of wheat, 656, 953
Burn of rice, 382
Burying crop residues, 608
Bush burning in the French Cameroons, 207
Busseola fusca, 920
Butterprint, penetration of 2,4-D in seed, 842
Butylphenol, 808
C^{14}, 884
Cajanus cajan, 202, 983, 1122
C. indicus—see Pigeon pea
Calandra spp., 59, 83, 1003
C. granaria, 1011
C. parvula, 319
Calopogonium mucunoides, 583
  intercropping with tung, 608
Calcium
  deficiencies, 471
  uptake of, groundnuts, 1051
Calcium arsenate, 146, 278, 1085
Calcium cyanamide, 1153
Camelina sativa, 1107
  var. Sv. 0700....468
Cameras, 567
Campanula, 541
Canada
  cereal diseases, 397
  Charlottetown Dom. Exptl Sta. Prog. Rep. 1937-47, 822, 927
  couch grass control, 1129
  Dept Agric. wheat varieties Rep. 1950, 306
  erucic acid from rape and mustard, 287
  field beans, 111
  Fort Vermilion Dom. Expt Substa. Prog. Rep. 1939-48, 926
  Fort William District Expt Substa. Prog. Rep. 1937-47, 268
  irrigated crops, 197
  oat varieties, 665
  Ottawa Central Exptl Farm Prog. Rep. 1938-47, 1233
  T. durum varieties, 647
  use of 2,4-D, 227
Canada thistle, 627—see also *Convolvulus arvensis*
Canary grass in North Africa, 473
Canavalia ensiformis, 983, 1122, 1240
  chemical composition, 571
Canavanine, 703
Cannabis sativa, 1192—see also Hemp
Caperonia castaneaefolia, 1161
Capsicum annuum, 178
Carbohydrate(s)
  content of sugar beet leaves, 1065
  formation and light, 531
  in wheat leaves, 234
  metabolism of cotton, 532
Carbon bisulphide, 116
Carbonic anhydrase in green plants, 237
Card sorting systems, 568
Carrots, var. Oxheart....926
Carthamus tinctorius—see Safflower
Caryedon fusca, 446
Cassava, 202
  before cotton, 583
  brown streak, 920
  chemical composition, 571
  disease resistance, 446
  in French Cameroons, 366
  in French Empire, 443
  in rotation, 920
  mosaic, 920
  mound cultivation, 482
  scale insect, 444
  varieties, 612, 1244
    Aipin Valenca....920
    Ankrah....920
    4026/20....920
Cassia, 599
C. mimosoides, 839
C. tora, 378
Castor, 281
  aleurone grains, 869
  and BHC, 250
  in Persia, 630
  seed viability test, 241
  transpiration and growth substances, 890
  varieties
    Conner....467
    Kansas Common Sel. Illinois No. 1....467
  vitamin C and respiration, 878
Catalase activity, 242
Catalase activity and manganese in rice, 525
Catalysis in groundnuts, 104
Cation exchange and plant roots, 550
Cavitomic cotton, 793
Cellophane, non-moistureproof, 898
Cellulose acetate film, 898
Cellulose source, *Oxytenanthera abyssinica*, 169
Cenchrus biflorus, 825
Centaurea spp., 627
C. cyanus, 675, 837
Central America, composition of food crops, 571
Centrosema plumieri, 583
Cercospora arachidicola, 103, 932
C. personata, 103
Cercosporella herpotrichoides, 23
Cereal leaf miner, 269
Cereal pests, 81
Cereal(s)
  and fertilizers, 282
  and sweet lupins, 823
  and 2,4-D, 502
  availability of phosphate, 596
  Avena fatua, 495
  common root rot, 1232
  DDT, 580
  deep transplanting, 729
  diseases, 281, 1232
    in Canada, 397
  drying for seed, 396
  fluorescence in grain, 733
  germination, 1038
  granulated fertilizers, 134
  green bug, 622
  in North Africa, 473
  irrigation, 485
  Loxostege control, 196
  mixed cropping in Denmark, 1029
  nutritive value of straw, 735
  removal of NPK from soil, 622
  root length, 881
  rust, 731
  seed composition and yield, 1033
  seed disinfection, 394
  seed inspection, 1032
  seed storage, 396, 1040
  seed treatment, 732, 1037, 1232
  separation of valuable seed, 395
  Swedish fly, 1038
  U 46, 1162
  varieties, 95, 393, 905, 918, 932, 1031, 1233
  vitamin B complex, 623
  weed control, 222, 499, 503, 509
  weeds, 1155, 1246, 1247
  white stalk borer, 920
  yields, 589
Ceresan, 19, 597, 622, 910, 1034, 1045
Ceresan M, 256, 335, 336, 671, 1232, 1237
Ceresan M slurry, 622
Ceresan NI, 336
Cerese, 1156
Ceylon
  chena, 1114
  rice, 1018, 1019
  shifting agriculture and dry farming, 1115
  shifting cultivation, 1114
Chaetocnema concinna, 578
C. tibialis, 767
Chamaecrista fasciculata, 281—see also Partridge pea
Chara gymnopitys, 836
Charcoal rot, of maize, 1000
Charcoal rot of sorghum, 1017
Charlock, 509, 1160, 1246
Chelation of trace metals, 856
Chemical carcinogens, 882
Chemical composition of cereal seed, and yield, 1033
Chemical growth regulators, 544
Chemurgic crops, 281
Chena, 1114
Chenopodium album, 214, 501, 514, 1163
C. zobelii, 1151
Chickpea, 534
  as cover crop, 646
  chemical composition, 571
  cutworm, 1060
  mound cultivation, 482
  sowing date, 922
  spacing, 922
  varieties, 599
Chicory and hormone herbicides, 223
Chilocorus distigma, 444
Chilo supressalis, 80
Chinche of maize, 358
Chitemene cultivation, 606
Chlorax, 621
Chlordane, 63, 64, 117, 358, 924, 1222, 1232
Chlorinated camphene, 63, 117
Chlorophenoxyacetic acids, 1168
Chlorophyll, 873
Chloropicrin, 281, 387, 698
Chloroplast suspension, 526
Chlorops oryzae, 80
Chlorosis of soyabeans, 100
Chloroxone, 378
Chocolate spot of beans, 416
Chondrilla juncea, 591
Chrozophora senegalensis, 825
Chrysanthemum, 504, 1246
C. leucanthemum, 276
Cicer arietinum, 646, 1060—see also Chickpea
Cirphis unipuncta, 924, 1002
Cirsium arvense, 214, 276, 514, 627
  phytotoxic effects of extracts, 560

Citrulline, 703
Citrullus vulgaris, pests and diseases, 408
Classification of agricultural land, 478
Classification of weeds, 512
Cleaning cotton, 457
Climate
  and cotton, 144, 150
  and crops, 182, 252, 253, 279
  and maize, 281
  and mineral and vitamin content of plants, 588
  in Angola, 1215
  in Argentina, 1216
  in France, 977
  in Towoomba, S. Africa, 1112
Climatic response of plants, 243
Climatic zones in the French Sudan, 204
Climatology, 907, 1217
  and cotton, 613
  microclimate, 1218
Clip cards, 568
Cloud and length of cotton growing season, 556
Clover, 217
  as green manure, 271
Clubroot, 142
  of swedes, 927
Coarse water grass, 836
Cobalt on buckwheat and flax, 231
Coconut milk, 882
  and excised pea root growth, 556
Colchicine and vitamin C formation, 534
Cold resistance of wheat, 643
Cold treatment of seed and vitamin C formation, 534
Cold treatment of sunflower seed, 766
Coleus spp., 900
Collective farms in USSR, 1256
Colletotrichum gossypii, 147, 787
C. kikuchii, 746
C. linicola, 1232
Colocasia in the French Cameroons, 366
Colombia
  agriculture, 1230
  cotton, 1087
Colouring agents for wheat variety testing, 654
Colza—see Rape
Combined grain, 737, 738
Combined straw disposal, 193
Combine harvesting and grain quality, 486
Commelina nudiflora, 215
Common Indian names for crops, 518
Common millet, 712
Common names of economic plants in Angola, 517
Common root rot, cereals, 1232
Common smut of sorghum, 72
Composition of food crops in Central America, 571
Composition of groundnut seed, 407
Compost on bullrush millet, 590
Compost on cotton, 590
Conditioning of shelled maize, 57
Conservation farming, 205
Conservation of maize, 1011
Conservation practices for Nebraska, 828
Constant cropping of beans, 627
Continuous light on wheat, 961
Contouring, 279
Convolvulus spp., 276, 355, 504, 1246
C. arvensis, phytotoxic effects of extract, 560
Copper, 932
  and growth stage in oats, 923
  and iron uptake of peas, 1182
  and mineral absorption from soil, 231
  on buckwheat and flax, 231
Copper carbonate, 116
Copper chloride, 499, 501
  effect on groundnut, 105
Copper content of plants, 233
Copper-cuproine complex, 524
Copper deficiencies, 588
Copper oxychloride, 116
Copper sulphate, 385, 501, 836
  as algaecide, 379
  on groundnut, 105
  on rice, 391
Copper traces in vegetation, 524
Copper uptake, 588
Corchorus spp.—see Jute
C. capsularis—see Jute
C. olitorius—see Jute
Corn borer, control by electric devices, 62
Corn cockle, 831
Corn earworm, 1237
Cornflower, 930
Corn rootworm, 359
Cosmophila erosa, 599
Costs
  cotton, 599
  crop production in Angola, 475
  groundnuts, 599
  hemp production, 158
  maize production in Angola, 488
  rice, 599
  rice farming in Arkansas, 89
  rice in Trinidad, 611
  soil conservation in Illinois, 827
  sorghum mixed with *Phaseolus radiatus* and 'tuer', 599
  wheat, 599, 1119
Cotton, 177, 202, 459
  and climatology, 144, 613
  and lime, 278
  and soil fertility, 456
  and sulphate of ammonia, 448, 590
  African pests, 452
  after fallow crops, 583
  after groundnut, 599
  after manured legumes, 599
  after sorghum, 599
  American bollworm, 452, 590
  anthracnose, 787
  aphids, 452, 454, 619
  ascorbic acid in leaves, 795
  bacterial blight, 590
  blackarm, 590
  boll maturation, 149
  boll set and blossoming date, 619
  boll weevil, 454, 619, 1237
  bollworm, 454, 590, 1237
  bad opening of bolls, 449
  cavitomic, 793
  cleaning, 457
  climatic effect on character, 150
  compost, 590
  costs, 599
  cultivation, 612
  damping-off of seedlings, 787
  development, effect of climatic differences, 150
  disease resistance, 1237
  drought resistance, 145
  fertilizers, 599, 600, 1076, 1091, 1092, 1093
  fibre structure, 877
  germination, 1084
  Gossypium arboreum var. nadam.... 145
  G. arboreum var. podupathi....145
  G. arboreum var. rozi....145
  G. barbadense, 1087
  G. barbadense var. Tanguis....1078
  G. herbaceum var. Hagari I....178
  G. hirsutum var. Marie Galante.... 1087
  gossypol, 788
  green manures, 1237
  growing season and cloudy days, 609
  growth changes in lint characters, 149
  growth changes in seed characters, 149
  harvesting, 283
  heat treatment of seed, 599
  Helopeltis bergrothi, 612
  hill-dropping, 1148
  horn beetle, 789
  in Algeria, 778
  in Australia, 152
  in Belgian Congo, 781, 784
  in Brazil, 144, 259
  in Colombia, 1087
  in French Morocco, 776
  in French Sudan, 188, 780, 818
  in French West Africa, 779
  in Hungary, 632
  in India, 145, 150, 1076
  in Morocco, 777, 1070
  in Mozambique, 1082
  in Nigeria, 637
  in Oklahoma, 447
  in Persia, 630
  in Philippines, 783
  in rotation, 590, 599, 920
    with green manure, 188
    with millet, 188
  insect control, 146, 1085
  insecticidal effects, 619
  insects and cross pollination, 1089
  insects in El Salvador, 1085
  insects in Somalia, 148
  in Sudan, 1071
  intercropped with groundnuts and chillies, 1116
  intercropped with *Hibiscus esculentus*, 921
  in Turkey, 782
  in West Australia, 593
  irrigated, correlation of yield and rainfall, 153
  irrigation, 178, 590, 594, 595, 923, 1070
  jassids, 791
  jassid beetle, 452
  land resting between crops, 590
  leaf curl, 590
  leaf deformities induced by phosphatic insecticides, 795
  leaf hopper jassid, 790
  machine picking, 595
  mechanical harvesting, 152, 590
  mechanized cultivation, 1073
  mites, 452
  mixed cropping, 481
  Namulonge Res. Sta., 291
  natural crossing, 794

nitrogen, 780
NPK, 920
pest control, 278, 453, 612
pests, 1075, 1237
picking machine, 594
pink bollworm, 454
pollination, effects on seed set, 151
pollination methods, 151
potash, 590
rainfall and yield, 590
ratooning, 1075
red bollworm, 452
red leaf disease, 600
red spider, 452
Research Institute in Pakistan, 638
residual effects of manuring, 590
Rhizopus nigricans, 787
ridges, 920
ridge width, 780
rock-phosphate and germination, 609
root rot, 145
root systems, 1090
rosy caterpillar, 789
rotations, 153, 818, 1070
salinization, 1088
Sea Island, 146
seed pathogens, 147
seed quality, 448
seed set, effects of pollination, 151
seed storage, 1237
seed treatment, 147, 278, 283, 787, 1082
seed viability test, 241
seed weight and plant height, 455
semi-looper caterpillar, 599, 1086
Sind-American, 449
soaking seed in nutrient solution, 599
sowing, 1069
sowing date, 178, 590, 594, 600, 1076
spacing, 448, 590, 594, 599, 600, 1074, 1240
spider mites, 792
spiny bollworm, 452
stainers, 452
stem weevil, 145
sulphate of ammonia, 590
sunshine, 1072
superphosphate, 590
Syagrus beetle, 452
Tachnid fly, 599
tannin content, 532
thrips, 454
thrips injury index, 1083
tie-ridging, 590
topping, 1074, 1076
trace elements, 600
treatment of seed against aphids, 113
triple superphosphate, 590
Upland, 146, 151
variability of lint, 458
varietal mixtures, 1080
varieties, 450, 469, 594, 595, 599, 612, 920
  A.2106....590
  Acala 130....782
  Allen....780
  Ashmouni....1076
  BAR.SP.84....1071
  BCR 14/16....590
  BP.52....590
  BP.79....1079
  C.520....451
  Co4B-15....600
  Coker 100....1083
  Coker 100 Wilt....1083
  Collins Stoneville,....1083
  D 181....590
  Deltapine 14....1077
  Deltapine 15....619
  Dhar Camboida....450
  Empire....278, 619, 1083
  Empire Wilt....1240
  Fox....1077
  G1....1116
  Gaorani 12F-2....1091
  Giza 7....1076
  Giza 12....1076
  Hariana Kapas (21 6F)....1056
  Hibred....1083
  Indore 2....450, 599
  Indore 3, P.B.5 (Buri 107 × Co2)....450
  Jarila....785
  Kalyan....600
  Laxmi (Seg. 9-3)....600
  Locket 140,....593
  Lousiana 33....619
  L.S.S.....1056
  M.-4....149
  M5A....600
  MA 2.....600, 790
  Maarad, 1076
  Malvi 9....600
  Malvi 10 (M9 × Bani)....450
  Malvi 12 (M9-20 × V.438)....450
  Miller 610....590
  Miller Lot 1....593
  MU8A....590
  MZ. 561....590
  New Mexico Alcala....590
  N'Kourala....780, 921
  N.R.5....785
  0246....1089
  0394....600
  P.B.3 (Jarila × Bhoj)....450
  P.B.9 (M9 × Jarila)....450
  P.B. 13 (M9 × V.434)....450
  Pima....776
  Pima 67....777, 921
  Sakel....1076
  Sealand 542....146
  Sind Sudhar....149
  Stoneville....784, 1083
  Stoneville 2B....795, 1077
  Strain 197-3....600
  Texacala....797
  Triumph....784
  Triumph Big Ball....1081
  V135....590
  VH8....590
  Wine Sap....1089
  Y.193....782
  9L34....590
  35/1....451
  41S....590
  68-5-8-2....600
  197-3....600, 785, 1116
  336B....600
  881F....600, 1116
  12204....590
vernalization, 797
verticillium wilt, 590
vicinism, 794
water, 1072
weed control, 619
weeds, 1144, 1145, 1146, 1147, 1148
wild *Gossypium* spp., 786
wilt, 532, 785
wilt resistance, 612
Couch grass, 832, 1129, 1233
Coumarin solution, 281
Cover crops, 52, 189, 279
  and maize, 932
  before wheat, 646
  in Hawaii, 925
Covered smut, 671
Cowpea, 96
  chemical composition, 571
  curculio control, 283
  in Australian sorghum scheme, 286
  ploughing before, 606
  seed viability test, 241
  varieties
    Chinese Red....1237
    Cristando....96
    Giant....96
    Groit....96
    Q 33 Reeve....593
    Reeves....96
Crabgrass, 513, 833, 1133, 1163, 1166
Crambe abyssinca, 812
Critical energy, 242
Critical moisture potential of wheat, 589
Cropping calendar, 178
Cropping plans in Germany, 815
Cropping ratio, 609
Crop production
  maize, in Algeria, 51
  rice, in Arkansas, 89
Crops and climate, 182, 252, 253, 279, 907
Crops, common Indian names, 518
Crop yields and cover crops, 279
Cross-thinning sugar beet, 141
Crotalaria, 590
  wilt, 283
C. juncea, 204, 922
  as green manure, 607
C. lanceolata, 189
C. retusa, 188, 204, 780
  as green manure, 717
C. sessiflora, 839
C. striata as green manure, 717
Croton sparsiflorus, 378
Crowfoot grass, 1136
Crown rust of oats, 39, 972
Cryocide, 509
CS-645A, 930
Cultivation
  of cotton, 612
  of field crops, 587
  of teasel, 1109
  of wheat, 281
Cupferron, 1232
Cupric chloride, 222
Cuprocide, 619, 932, 1237
Cuproine, 524
Curculio of cowpea, 283
Curly ryegrass, 326
Cuscuta pentagona, 767
Cutworms, 277, 281, 1060
Cyamopsis psoraloides var. Malosan 40....110, 713
C. tetragonoloba as green manure and fodder crop, 923
Cyanamide, 1165
Cyanogas, 599
Cyclocephala borealis, 747
Cymbopogon nervatus, 190
Cynodon dactylon, 220, 604, 1130, 1147
Cyperaceae, 215, 221, 378
Cyperus rotundus, 213, 215, 220, 356, 591, 836, 1133, 1135, 1136, 1142, 1147

Cyprus, Quart. Rev. No. 24, 1951, 1246
Cyrtomenus sp., 358
C. ciliatus, 358
Cytochrome oxidase in maize embryos, 868
Cytochrome system in higher plants, 279
Dactyloctenium aegyptium, 604, 1136
Damping-off of cotton seedlings, 787
Damping-off of sugar beet, 621
Datura ferox, 1151
D. tatula, 496
D. metel, 496
Day length and plant distribution, 541
DCPA, 499, 1150
DD, 281
DDD, 930
DDT, 61, 63, 64, 80, 99, 116, 117, 175, 196, 383, 385, 386, 433, 444, 509, 577, 578, 590, 752, 754, 912, 920, 924, 928, 930, 933, 1011, 1060, 1085, 1222, 1224
  and germination, 753
  and plant development, 580
DDT-sulphur, 1237
Decomposition of 2,4-D, 515
Deep transplanting of cereals, 729
Degeneration of cultivated oats, 338
Degeneration of wheat, 24
Denmark
  landscapes, 901
  mixed cereal cropping, 1029
Depth of ploughing, 824
  in Senegal, 825
  rice, 719
Depth of sowing peas, 414
Depth of sowing sugar beet, 138
Derris, 80, 578, 920
Desmodium, 263
D. racemosum, 839
Detection of cytochrome oxidase in maize embryos, 868
Detection of internal diseases in bean seed, 115
Determination
  of carbohydrates in wheat leaf, 234
  of copper content of plants, 233
  of formative effect of chemical growth regulators, 544
  of germination capacity, 1209
  of nitrogen in wheat leaves, 235
  of plant phosphorus content, 896
  of plant response to growth substances, 1207
  of potassium content, 1211
  of sodium in plants, 1212
  of traces of copper in vegetation, 524
  of vitamin C in plants, 530
Development of maize, 1006
Development of wheat, 8
Development of wheat seedlings after water treatment, 28
Diabrotica spp., 281, 359, 931
D. undecimpunctate howardii, 932
Dibromobutene, 1221
Dichloropropene-dichloropropane mixture, 698
Dieldrin, 358, 930, 1232
Diethanolamine, 233
Digitaria spp., 215, 513, 521, 1133, 1147, 1163, 1166
D. exilis, 900
D. iburna, 900
D. sanguinalis, 833, 865
Dinitro compounds, 1146, 1163, 1165
Dinitro-o-cresol, 222
Dioscorea spp., 1067
D. alata, 1113
  chemical composition, 571
D. minutiflora, 445
D. smilacifolia, 445
Diparopsis, 590
D. castanea, 452
Dipsacus fullonum, 814, 1109
Disease control in India, 911
Disease resistance, 279
  barley, 49, 276, 980, 1237
  beans, 276
  cereals, 48, 264
  cotton, 1237
  effect of sowing date on cereals, 18
  groundnuts, 102
  linseed, 162
  oats, 39, 43, 278, 972
  plants, 1199
  sorghum, 71
  wheat, 1237, 1255
Diseases—see also Viruses
  cereals, 1232
  crown rust of oats, 39
  of maize, in Indiana, 697
  of soyabeans in Illinois, 745
  in S. Rhodesia, 575
  stem rot of rice, 82
  stem rust of oats, 39
  yellow wilt of sugar beet, 129
Disinfection of cereal seed, 394
Distichlis stricta, 281
Dithane, 276
Dithio-oxamide, 233
Dithizone, 233
Diurnal variation in effectiveness of Methoxone, 251
DNPB, 414, 752
DNC, 271, 808
DNOC, 214, 499, 501, 514, 752, 836
Docks, 1155
Dolichos lablab, 983, 1122
  chemical composition, 571
  potassium nutrition, 528
Domestication climax, 478
Double cropping of rice, 370, 389, 598
Double ploughing of rice, 266, 267
Double rice, 1025
Doubles, effect on sugar beet yield, 124
Double transplanting of rice, 598
Dow G, 1145
Dow 9B, 256, 932, 1237
Dreft, 66, 1155
Drought
  and flowering of maize, 1008
  and wheat yields, 939
  control by water regulation in Venetia, 183
Drought resistance
  of cereals, 33
  of cotton, 145
  of *Vicia* spp., 112
  of wheat, 8, 922
  of wheat, and 2,4-D, 557
Dry farming in Ceylon, 1115
Drying cereals for seed, 396
Drying groundnuts, 751, 1054, 1237
Dryland crop rotations, 281, 621
Dry matter, water and sugar relationships in sugar beet, 132
Dumbaria villosa, 839
Dwarfing in maize, 357
Dysdercus, 452
Earias spp., 452, 590, 776
Earworm, 64
  maize, 1237
East Africa
  fibre, 161
  groundnut scheme, 171
  groundnut scheme Rep. 1949, 406
  soil conservation, 202
Echinochloa colona, 1157
E. crus-galli, 173
Ecology and plant development, 323
Economic plants in Angola, 517
Eelworm, 434
Eichhornia azurea, 834
E. crassipes, 227, 378, 497, 498, 836, 1131
Electrocutor corn-borer traps, 282, 930
Electro-magnetic treatment of maize pollen, 67
Elephantopus scaba, 215
Eleusine coracana, 178, 202, 597
  and mound cultivation, 482
  chitemene cultivation, 606
  mixed cropping, 481
  origins, 900
  var. Jaqudan 44....110
El Salvador
  Centro Nac. Agron., Rep. 1944-8, 1239
  Centro Nac. Agron., Rep. 1949, 1240
  cotton insects, 1085
  green manures, 1122
  hybrid maize, 995
  maize, 983
  sesame, 1095
  sorghum, 1014
  yams, 1067
Emex, 504
Empoasca, 776
E. devastans, 790
Endomycin, 1220
Endothal, 1165, 1169
Enhydris angustipetala, 836
Environmental effect on groundnut composition, 277
Enzyme activity and manganese in rice, 525
Enzymes and plant growth and nutrition, 588
Enzymes and seed germination, 282
Epicauta, 930
E. lemniscata, 747
Epilachna varivestis, 747
Erbitox, 511, 1156
Erosion control, 200, 203, 281, 491, 599
  by *Neomarica northiana*, 1125
Erosion of wheatlands, 201
Erosion induced by stubble burning, 208
Erucic acid from mustard and rape, 287
Erysiphe graminis hordei, 313, 980
Esso oil, 1145
Esso Process oil 2105, 1146
Ester of phosphoric acid, 433
Estimation of leaf area in maize, 537
Estimation of nitrate requirements of wheat, 31
Ether vapour on rice, 380
Ethylene and wheat germination, 863
Ethylene dibromide, 698
Ethylene oxide, 1040
Eupatorium, 599
Euphorbiaceae, 378
Euphorbia esula, 1233
E. prostrata, 215

Europe
  agricultural advisory services, 270
  maize hybrids, 288
European corn borer, 61, 279, 281, 282, 622, 928, 989
Eutinobothrus brasiliensis, 789
Euxestia stigmatias, 117
Evaluation of insecticidal toxicity, 1210
Evolution of sunflower, 1103
Experimental layout for herbicide trials, 228
Experimental plot size, 598, 915, 916
Extar-Sandoz, 1171
Eye-spot, 21
  of wheat, 23
Factors affecting values of herbicides, 228
Fagopyrum esculentum—see Buckwheat
Falcata comosa, 839
Fall armyworm, 63, 64, 117
Fallow(s) 612
  in cotton/millet rotation, 188
  in Gambia, 474
  in rotation, 590, 596
Farming systems in Austria, 820
Farming systems in Nebraska, 1117
Farmyard manure, 609
Fat in groundnut seed, 407
Fat in stems, and water supply, 240
Fat lamb production and rice in Australia, 173
Fernoxone, 604
Ferrous sulphate, effect on soyabeans, 100
Fertility of maize (irrigated), 281
Fertility of ploughed up lucerne, 269
Fertilizers, 1, 25, 50, 52, 53, 86, 133, 178, 188, 266, 269, 271, 276, 277, 278, 279, 281, 282, 283, 337, 471, 596, 599, 861, 906, 922, 927, 931, 1185, 1233
  and barley, 347, 398, 736
  and cotton, 599, 600, 920, 1076, 1091, 1092, 1093
  and flax, 592
  and fodder beet, 757
  and groundnuts, 604, 1052, 1053
  and *Hibiscus* spp., 160
  and maize, 621, 707, 930, 931, 983, 1240
  and mangolds, 757
  and oats, 398
  and rape, 1105, 1106
  and rice, 610, 717, 719, 724, 725, 736, 920, 1027, 1237, 1240, 1244
  and rye, 976
  and safflower, 621
  and sorghum, 599
  and sugar beet, 135, 757, 773
  and sunflower, 1104
  and wheat, 398, 621, 645, 664, 736, 963, 964
  and yam, 1238
  granulated, on cereals, 134
  granulated, on sugar beet, 134
  in Japan, 736
  lignin, 1226
  nitrogen, on barley, 46
  placement, 282, 589
  placement drilling, 480
  placement, on maize, 930
  radioactive sulphur, 982
  rotations, 479, 822
  trials, rice, 87
Fibre(s)
  crops, 1238
  in E. Africa, 161
  in Nigeria, 637
  structure in cotton, 877
Field bindweed, 514, 560, 627
Field crops, 587
  varieties, 569
Field experiments, 589, 1227
Fiji
  agricultural research, 258
  agriculture, 1113
  Dept Agric. Ann. Rep. 1949, 924
Fimbristylis exilis, 825
Finger millet—see *Eleusine coracana*
Finland
  Hankkijas Plant Breed. Sta. 1946-9, 1248
  root crops, 1068
  rye, 974
  turnip rape, 811
  wheat, 944
Flax, 156, 202
  aleurone grains, 869
  altitude and behaviour, 323
  and boron, cobalt and copper, 231
  and BHC, 156
  and molybdenum, 799, 851, 1183
  and magnesium, 799
  and manganese, 1183
  and nitrogen, 799
  and 2,4-D, 226, 559
  catalase activity, 242
  critical energy, 242
  diseases, 1232
  environment and development, 323
  fertilizers, 592, 1233
  fibre quality, 591
  germination and hot and cold seed treatment, 865
  harvesting date, 592
  hormone herbicides, 223
  in Argentina, 460
  inhibition of seedling roots by weed extracts, 560
  in Persia, 630
  in Venetia, 154
  isopropyl phenylcarbamate, 559
  light sensitivity and hot and cold seed treatment, 865
  production, 279
  removal of NPK from soil, 622
  root growth and auxins, 552
  rust resistance, 923
  seed composition and water supply, 240
  seedling blight, 1232
  seed treatment, 622
  sowing date and wax content, 624
  sowing methods, 592
  stem-break and browning, 1094
  sulphur and nitrogen metabolism, 852
  varieties, 17, 622, 624, 923, 1247
    Concurrent....155, 798
    Formosa....155, 798
    Hercules....155
    Hollandia....155, 798
    Liral Crown....155
    Liral Dominion....1232
    Liral Prince....1232, 1233
    Marsich....242
    Percello....155, 798
    Redwing....926
    Rembrandt....798
    Riga Blue....154
    Stormont Cirrus....1232
    Stormont Gossamer L. 26....1232
  weed control, 226, 462, 508
  weeds, 1232
  wild oats and IPC, 845
  yields, 461
Flea beetle, 433, 747
Flood resistance of rice, 374
Flood-water farming, 922
Flora and useful plants of the Southern Hemisphere, 846
Floral abortion of rice, 388
Flora of the Belgian Congo, 582
Flowering hormone production in jute, 159
Flower-thrip, 117
Fluorescein, 922
Fluorescence of cereal grains, 733
Fluosilicate dust, 173
Fodder beet, 755
  beet flea, 769
  calculation of yields, 774
  fertilizers, 757
Fodder sugar beet, 755
  topping, 421
Food crops of Central America, 571
Foot rot
  maize, 999, 1000
  rice, 597
  wheat, 730
Forecasting, wheat yields, 939
Formaldehyde, 381, 671
Formalin, 387
Formative effect of chemical growth regulators, 544
Formol, 381
4 chloro-o-toloxyacetic acid, 883
4K-2M, 218, 224, 501, 835
Foxtail millet, 712
  identification, 711
France
  agricultural trade with Italy, 634
  barley, 977
  climate, 977
  frost control measures, 908
  maize, 988
  oil crops, 1108
  sorghum, 1015
  wheat vernalization, 661
French Africa, Inst. Res. Cot. Textiles exotique Rep. 1948-9, 921
French Cameroons
  bush burning, 207
  rice, 366
French Empire,
  cassava, 443
  maize, 348
French Equatorial Africa
  groundnuts, 821
  rotations, 821
French Guinea, *Brachiaria deflexa* var. *sativa*, 727
French Morocco, cotton, 776
French Sudan
  agriculture, 177
  climatic zones, 204
  cotton, 780
  development of ' Delta Central,' 818
  rice, 373, 717
  soil regeneration, 204
French West Africa
  agricultural research, 1213
  cotton, 779

  cultivation of *Pennisetum*, 362
  mechanized groundnut cultivation, 748
Frit flea of oats, 670
Frit fly, 42, 192
Frost and sugar beet strangles, 428
Frost control measures in France, 908
Frost resistance
  barleys, 37
  maize, 696
  Vicia spp., 112
  wheat, 8, 945
Frozen soil and seed development, 1190
Fumaria 504, 1246
Fumigants
  copper sulphate, 381
  Cyanogas, 599
  ethylene oxide, 1040
  formaldehyde, 381
  hydrocyanic acid, 1040
  methyl bromide, 1040
  methyl formate, 1040
Fungi, 279
Fungicides, 952, 1048, 1219
  Aagrano, 336
  Abavit, 1034
  Actidione, 671
  Agrano, 377
  Agrosan, 597
  Agrosan GM, 1035
  Agrosan GN, 377, 1034
  and cotton, 787
  and peas, 414
  Arasan, 621, 696, 910, 931, 932, 1045, 1232
  Arasan 45, 1035
  Arasan SF, 256, 932
  Barsprout, 932
  BHC, 732
  Bioquin I, 256
  Borax, 1232
  Bordeaux mixture, 1244
  Ceresan, 19, 597, 622, 910, 1034, 1045
  Ceresan M, 256, 335, 336, 671, 1232, 1237
  Ceresan M slurry, 622
  Ceresan NI, 336
  Chloropicrin, 387
  copper, 932, 1036
  copper-based, 382
  Cupferron, 1232
  Cuprocide, 619, 932, 1237
  dibromobutene, 1221
  Dithane, 276
  Dow 9B, 256, 932, 1237
  formaldehyde, 381, 671
  formalin, 387
  Formol, 381
  General Chemical 668, 932
  Granosan, 910, 1035
  Lunasan, 1034
  mercurial residues on wheat seed, 19
  mercury, 1036
  mercury-based, 382
  Mergamma, 732
  NI Ceresan, 256, 335, 626
  No. 5400, 278
  Panogen, 256, 335, 336, 622, 932
  Panogen 8, 671, 1232
  Perenox, 1244
  phenylthiohydantoic acid, 1232
  Phygon, 256, 377, 910, 932
  Phygon-XL-DDT, 983, 1035
  precautions in using, 516
  Rodan, 321
  Seedox, 932
  Semesan Jr., 910, 983
  Shell Copper Fungicide, 1244
  Spergon, 109, 256, 377, 910, 931, 932, 1045, 1237
  Spergon DDT, 932
  Spergon-SL-DDT, 1035
  Spersul, 1244
  sulphur, 932
  testing distribution on seed, 255
  tetramethyl thiuram disulphide, 1232
  TMTD, 377
  Vancide 51, 1045
  W. Phygon, 932
  W. Seedox, 932
Fungocina, 1191
Fusarium spp., 381, 730
F. lini, 162, 1097
F. moniliforme, 147, 1017
F. root rot of beans, 276
F. vasinfectum, 147
Galeopsis spp., 835, 1247
Galium spp., 1246
Galvanized burr, 591
Gambia, land use, 474
Gambia pea, 96
γ-(Indole-3)-butyric acid, 890
Gammatox, 920
Gammexane, 385, 590, 933, 1002—see also BHC
Garlic, 625
Garlic extract and germination of wheat and rye, 864
Gastrionargus musicus, 912
Geigy 33, 754
Gelbspritzmittel, 462
General Chemical 668, 932
Geotropism of maize, 621
German millet, 712
Germany
  beet leaf bug in Saxony, 770
  cropping plans and rotations, 815
  crop rotation and soil erosion, 829
Germination
  and ascorbic acid, 30
  and hot and cold seed treatment, 865
  and rootone, 28
  and water, 28
  capacity of seeds, 1209
  cereals, 1038
  cotton, 1084
  energy, 1188
  enzymes, 282
  inhibitor from sugar beet, 131
  in the dark and vitamin C formation, 534
  maize, 281, 930
  of pollen grains, 1192
  Striga hermonthica, 1139
  water hyacinth, 1131
  weed seeds, 840, 841
  wheat, 951
Gleichenia, 836
Glutamic acid, 246, 703
Gluten quality of wheat, 950
Glycine, 246
G. javanica, 608
G. max, 983—see also Soyabean
G. ussuriensis, 839
Gold of Pleasure—see *Camelina sativa*
Gossypium spp.—see Cotton
Grades of soyabean, 572
Grading of wheat seed, 316
Grain
  combined, 737
  crops, 277
  grading, 572
  moisture content measurement, 740
  quality and combine harvesting, 486
  respiration during ripening, 239
  soaking seed in nutrient solution, 599
  seed weight loss, 239
  storage, 573, 584
Grain drying, 281, 738, 739
  in bags, 1223
  rice, 1237
  sorghum, 1237
Granosan, 910, 1035
Granulated fertilizers
  on cereals, 134
  on sugar beet, 134
Grass fallows, 590, 609
Grasshoppers, 81, 1225, 1232
  on barley, 981
Grass in rotation, 920
Great Britain
  agricultural research, 1229
  Home Grown Threshed Peas Joint Cttee Prog. Rep. 1945-9, 414
  Rothamsted Expt Sta. Rep. 1949, 589
Greece, agriculture, 1111
Greenbug on cereals, 622
Green manure(s), 52, 53, 271, 279, 607, 609, 922, 906
  Canavalia ensiformis, 1240
  Chinese Red cowpeas, 1237
  crops, 609
  Crotolaria juncea, 922
  C. retusa, 188, 780
  hairy vetch, 1237
  in El Salvador, 1122
  in French Equatorial Africa, 821
  in French Sudan, 177, 204
  in Hawaii, 925
  in rotation, 590
  in rotation with cotton, 188
  on cotton, 1237
  on maize, 1240
  on rice, 717
  on sugar beet, 423
  seed in Australia, 96
  seed rate, 1122
  Singletary pea, 410
  Sorghum sp., 780
  Trifolium alexandrinum, 1070
  wheat, 599
  Willamette vetch, 1237
Green peach-potato aphid, 429
Groundnuts, 931, 932, 923
  Acacia aphis, 1050
  and 2,4-D, 215
  after lupins, 189
  after *Melilotus alba*, 189
  after tobacco, 608
  before maize, 594, 595
  bruchid beetle, 446
  calcium uptake, 105, 1051
  catalase activity, 242
  catalysis, 104
  Cercospora control with sulphur, 103
  chemical composition, 571
  continuous cropping, 932
  copper chloride, 105
  copper sulphate, 105
  costs, 599
  critical energy, 242
  disease resistance, 102
  drying, 932, 1054, 1237
  duration of growth, 407
  environment and composition, 277

environment and oil content, 106
fertilizers, 278, 604, 1052, 1053
fruit formation, 750
fungicides and seed inoculation, 931
harvesting and drying, 751
improvement, 277
in East Africa, 121
in French Equatorial Africa, 821
in Gambia, 474
in Nigeria, 636
in Orange Free State, 182
in Queensland, 1055
in rotation, 606, 821, 931, 932
intercropped with cotton, 1116
intercropped with tung, 608
interplanted in maize, 482
in West Australia, 593
leaf spot, 932
maleic hydrazide, 888
manganese, 931
mechanized cultivation, 821
  in British East Africa, 749
  in French West Africa, 748
  in Senegal, 409
mixed cropping, 481
nutrition, 277
oil content, 106
oxydase activity, 104
pest control, 612
pests and diseases, 408
phosphate, 593, 594
photosynthesis, 104
planting, 1244
ploughing before, 606
potash, 593, 594
respiration, 104
saponification number, 240
seed composition, 407
  and water supply, 240
seed treatment, 612, 910, 931, 932, 1048, 1049
sheller, 107
southern maize root worm, 931, 932
southern wilt, 932
sowing dates, 178
spacing, 278, 1244
successive cropping, 606
sulphur dusting, 105
varieties, 570, 607, 612, 932, 1238
  AH 25....178
  AH 477....599
  Arachis rasteiro × Virginia Jumbo strains....101
  B.227....609
  B.239....609
  Common runner....101
  Dixie runner....101, 105
  Fla 230-118....101
  Fla 231-51....101
  Fla 249-40....101
  Florida runner....101
  Ga 207-3....101
  Jumbo....751
  Natal Common....274
  Red Spanish....593
  Runner....278, 751
  Schwarz 21....102
  Spanish....278
  Spanish 18-38....101
  Spantex....1237
  Virginia....278
  Virginia Bunch....274, 407, 593
  Virginia Jumbo....932
water consumption, 248
wild forms of *Arachis*, 263
  with pigeon peas, 597
Growing field peas, 411
Growing plants with roots in sterile medium, 894
Growth
  and water regime, 545
  changes in cotton lint and seed, 149
  hormones and plant metabolism, 929
  of excised barley and oat roots, 554
  of excised pea roots, 556
  of isolated maize roots, 555
  of maize seedlings, 281
Growth substances, 596, 1201, 1202
  and light, 892
  and peas, 1200
  and split pea stems, 892
  and sugar beet, 1200
  and sunflower, 882
  and transpiration, 890
  and weed control, 1127
  and wheat, 1200
  BHC, 1203
  B-(Indole-3) propionic acid, 890
  B-naphthoxyacetic acid, 890
  chemical carcinogens, 882
  coconut milk, 882
  4 chloro-o-toloxyacetic acid, 883
  γ-(Indole 3)-butyric acid, 890
  indoleacetic acid, 882
  indole 3-acetic acid, 890
  indolyl acetic acid, 922
  inhibition of flowering in long-day plants, 563
  IPC, 1127
  IPPC, 1130
  maleic hydrazide, 772, 882, 889, 1205
  MCPA, 1127
  P-chlorophenoxyacetic acid, 890
  plant response to, 1207
  TCA, 1127
  2,4-D, 883, 890, 1127, 1162, 1207
  2,4,5-T, 883, 1127
  2,3,6-trichlorobenzaldehyde, 1204
  2,3,6-trichlorobenzoic acid, 1204
  types M and D, 214
  U 46, 1162
Guesarol, 385
Guiana, rice, 721
Guinea corn, in Nigeria, 636
Gytol, 63, 64
Hairy vetch, erosion control, 490
Halictus 4-strigatus, 1089
H. patellatus, 1089
Harvesting groundnuts, 751
Harvesting sugar beet, 440
Harvesting date of flax, 592
Harvesting date of soyabeans, 1042
Hawaii, Univ. Agric. Expt Sta. Rep. 1950, 925
Hay
  Singletary pea, 410
  soyabean, 399
HCH 99—see also BHC,
Hedychium coronarium, 1110
Helianthus annuus, 1103—see also Sunflower
H. bolanderi, 1103
Heliopsis, 936
Heliothis spp., 454
H. armigera, 64, 117, 452, 509, 577, 590, 1085
H. obsoleta, 1002
Helminthosporium, 382
  blight of oats, 1237
H. gramineum, 336
H. oryzae, 723
H. sativum, 1232
H. turcicum, 60
H. victoriae, 39, 43
Helopeltis bergrothi, 612
Hemicellulose fraction of groundnut seed, 407
Hemicelluloses of wheat straw, 876
Hemp, 832
  altitude and behaviour, 323
  cost of production, 158
  cultivation, 158
  environment and development, 323
  for seed in Italy, 800
  harvesting, 157
  in Argentina, 158
  seed production, 463
  varieties, 1247
    Ancona....158
    Bologna....158
    Bolognese....463
    Carmagnola....463
    China....158
    Common....158
    Himalayan....158
    Indian....158
    Piamonte....158
    Tsingmá....158
Heracleum sphondylium, 1162
Herbarium preservatives, 898
Herbicides, 225, 1144, 1232
  adjuvants, 1169
  aerial spraying, 509
  Agroxone, 599, 604, 1156, 1171
  Agroxone ICI, 511
  and plant response, 1143
  and soil micro-organisms, 1171
  and vitamins, 1200
  Arasan (TMTD), 628
  bentonite powder, 216
  Borweed, 1171
  butylphenol, 808
  calcium cyanamide, 1153
  Cerese, 1156
  Chlorax, 621
  chlorophenoxyacetic acids, 1168
  Chloroxone, 378
  copper chloride, 499, 501
  copper sulphate, 501
  cupric chloride, 222
  cyanamide, 1165
  DCPA, 499, 1150
  DDT, 1060
  dinitro compounds, 1146, 1163, 1165
  dinitro-o-cresol, 222
  DNC, 271, 808
  DNOC, 214, 499, 501, 514, 752, 836
  DNPB, 414, 752
  Dow G, 1145
  Dreft as wetting agent, 66
  Endothal, 1165, 1169
  Erbitox, 511, 1156
  Esso oil, 1145
  Esso Process oil, 2105, 1146
  evaluation, 228, 1164
  Extar-Sandoz, 1171
  Fernoxone, 604
  4K-2M, 218, 224, 501, 835
  Gelbspritzmittel, 462
  growth-regulating substances, types M and D, 214
  Herbogil, 504
  Hexane, 1145
  hormone, 223, 1128, 1129, 1130, 1131, 1132, 1133, 1200

  hormone derivatives, 514
  hydrocarbon compounds, 1142
  INBP, 228
  IPC, 625, 845, 1127, 1160, 1165, 1166
  lateral application, 1147
  LHH1, 1133, 1145
  LHH1-OX, 1145
  LHH 7, 1145
  Lion oil, 1145
  Lion oil LHH1, 1146
  maleic hydrazide, 1166
  MCPA, 222, 414, 499, 509, 752, 1127
  Methoxone, 219, 378, 835, 1166
  methyl bromide, 1136
  Metoxone, 1151
  naphtha, 1133, 1147
  o-isopropyl N-phenyl carbamate, 833
  o-isopropyl N-(-3 chlorophenyl) carbamate, 833
  on maize, 1150, 1151
  pentachlorophenol, 836, 1137, 1160
  penta dinitro compounds, 1145
  petroleum, 1167
  petroleum oils, 1165
  phenoxylen, 1247
  phenyl mercuric acetate, 1166
  physiological action on maize, 66
  Polybor, 621
  Polybor-chlorate, 621
  polyethylene glycol, 1154
  potassium cyanate, 1165
  precautions in using, 516
  pre-emergence sprays, 1144
  Raphone, 604
  Santobrite, 220
  screening, 1163
  selective in wheat, 503
  Shell oil, 1145
  Shell oil 170, 1146
  Sinox, 220
  Sinox G, 1145
  Sinox W, 127, 1145
  sodium arsenite, 836
  sodium chlorate, 604, 836, 1134
  sodium 2,4-dichlorophenoxyethyl sulphate, 513
  Sovacide, 836
  spraying machines, 225
  Stirpan, 216
  sulphuric acid, 222, 499
  Supersinox, 216
  TCA, 356, 623, 625, 836, 928, 1127, 1134, 1135, 1137, 1138, 1157, 1160, 1165
  3,6-endoxohydrophthalates, 1166
  Tufor, 378
  2,4-D, 40, 66, 85, 213, 215, 216, 217, 218, 219, 220, 222, 226, 227, 276, 335, 364, 378, 496, 497, 498, 501, 504, 505, 507, 509, 621, 835, 836, 837, 838, 843, 928, 1126, 1127, 1128, 1132, 1135, 1137, 1150, 1152, 1154, 1155, 1156, 1159, 1161, 1162, 1163, 1165, 1169, 1172, 1246
  2,4-dichlorophenyethyl, 1163, 1166
  2,4-dinitro-6-secondary-butylphenol, 1149
  2,4,5-T, 496, 497, 505, 1127, 1137, 1237
  2,3,5-T, 1186
  U 46, 462, 1162
  Varsol B, 1145
  Weed-no-more, 1151
  Weedone, 216, 511, 1156, 1171
  Weedone 40, 221
Herefordshire
  marginal land use, 191
  mineral deficiencies, 471
  pioneer cropping, 191
Hessian fly, 625, 930
Heteroauxin as micro-fertilizer, 546
Heteroauxin treatment of sugar beet seed, 426
Heterodera schactii, 434, 1221
Heteroligus claudius, 446
HETP, 130, 796
Hexachlorane, 1038, 1050, 1063
Hexane, 1145
Hexyclan—see BHC
Hibiscus, 541
H. braziliensis, fertilizers on, 160
H. cannabinus, 465, 921
  boron on, 523
  fertilizers on, 160
  in Nigeria, 636
  sowing date, 269
  spacing, 269
H. esculentus, 938
  intercropped with cotton, 921
  seed viability tests, 241
H. macrophyllus, trials, 602
H. sabdariffa, trials, 602
Hill-dropping of cotton, 1148
Hispa spp., 384, 385
Hoary cress, 591, 1132, 1233
Holland
  agriculture, 1123
  14th NaCoBrouw Yearbook, 1950, 933
  linseed, 806
  maize, 686, 710
  soil blowing, 1124
Homosis, 1175
Hong Kong
  Dept Agric. Ann. Rep. 1950, 1243
  rice cultivation, 365
Hordeum vulgare—see Barley
Hormone derivatives, 514
  on cereals, 218
Hormone herbicides, 223, 224, 1200
Hot water treatment, 617
  of cotton seed, 599
  of seed, 317
Hungary
  alkaline steppes, 816
  cotton, 632
Hybrid buckwheat seeds, 328
Hydrochloric acid, 1084
Hydrocotyle bonariensis, 604
Hydrocyanic acid, 1040
Hydrotimetes, 383
Hygroscopic equilibrium, 535
Hymenachne myaros, 836
Hyptis spicigera, 900
Hyssopum, 541
Identification of brassicas, 519
Imperata cylindrica, 215, 836
INBP, 228
India
  agricultural terminology, 1252
  American cotton, 150
  Baroda, pulses and millets, 110
  Cent. Cott. Cttee Rep. 1948-9, 600
  common names of crops, 518
  Counc. Agric. Res. Ann. Rep. 1948-9, 597
  Cuttack Rice Res. Inst. Rep. 1946-8, 272
  Cuttack, Rice Res. Sta. Ann. Rep. 1948-9, 598
  Egyptian cotton, 1076
  Indian Agric. Res. Inst. Sci. Reps 1947-8, 922
  Indore Inst. Plant Industr. Rep. 1949, 599
  insect and disease control, 911
  jute, 802
  mixed cropping, 481
  perennial cotton, 145
  pulses and millet in Gujerat, 713
  Tungabahadra irrigation project, 178
  Uttar Pradesh, Dept Agric. Ann. Admin. Rep. 1949, 1245
  weights and measures, 1251
Indicator plants in Senegal, 825
Indigofera hirsuta, 189
I. pseudo-tinctoria, 839
Indolane, 117
Indoleacetic acid, 882
  and excised pea root growth, 556
  induction of lateral pea roots, 551
Indole-3-acetic acid, 890
  and flax root growth, 552
Indolyl acetic acid, 922
Indonesia, use of 2,4-D, 227
Inga spp., chemical composition, 571
I. leptoloba, 571
I. paterno, 571
I. preussi, 571
Inhibition of flowering in long-day plants by growth substances, 563
Inhibition of nitrate assimilation in wheat, 891
Inhibitory substances in plants, 561
Inoculation
  of lupins, yellow sweet, 1061
  of singletary pea seed, 410
  of soyabean seed, 1044
Insect control in India, 911
Insects, cross pollination of cotton, 1089
Insecticides
  aerial spraying, 509
  Agrocide, 1250
  Agrocide 3, 1244
  Aldrin, 358, 359, 930, 1232, 1250
  arsenic, 433
  arsenic pentoxide, 912
  barium chloride, 1063
  BHC, 63, 80, 81, 99, 117, 146, 156, 196, 281, 383, 386, 430, 435, 509, 562, 578, 769, 912, 913, 920, 924, 931, 932, 1037, 1085, 1222, 1237
  bis anhydride, 113
  bis dimethylamine phosphonous anhydride, 130
  calcium arsenate, 80, 146, 278
  carbon bisulphide (fumigant), 116
  chlordane, 63, 64, 117, 358, 924, 1222, 1232
  chlorinated camphene, 63, 117
  chloropicrin, 281, 698
  copper carbonate, 116
  copper oxychloride, 116
  copper sulphate, 385
  Cryocide, 509
  CS-645A, 930
  DD, 281
  DDD, 930
  DDT, 61, 63, 64, 80, 99, 116, 117, 173, 196, 383, 385, 386, 433, 444, 509, 577, 578, 590, 752, 754, 912, 920,

  924, 928, 930, 933, 1011, 1085, 1222, 1237, 1244
  Derris, 80, 578, 920
  dichlorophene mixture, 432
  dichloropropene/dichloropropane mixture, 698
  Dieldrin, 358, 930, 1232
  ester of phosphoric acid, 433
  ethylene dibromide, 698
  evaluation of toxicity, 1210
  fluosilicate dust, 173
  Gammatox, 920
  Gammexane, 385, 590, 933, 1002
  Geigy 33, 754
  Guesarol, 385
  Gytol, 63, 64
  HETP, 130, 795
  hexachlorane, 1038, 1050, 1063
  hydrochloric acid, 1084
  Indolane, 117
  induced phytotoxicity in sorghum, 63
  Isotox, 63
  kerosenated rope, 385
  locust bait, 912
  Lonchocarpus dusts, 578
  Methoxychlor, 63, 64, 117
  Methoxy DDT, 63, 64
  nicotine, 146, 433, 578
  nicotine sulphate, 768
  on beans, 627
  on cotton and boll weevil, 619
  on cotton pests, 452
  organic phosphates and cotton leaf deformities, 795
  Paraoxon, 130
  Parathion, 63, 64, 117, 130, 358, 622, 792, 795, 930, 1064, 1206, 1222, 1244
  Paris green, 924, 1085
  persistence, in soil, 1222
  Pestox, III 1064
  plant responses to, 1222
  precautions in using, 516
  pyrethrin, 64, 936
  RB, 383, 386
  rhothane, 117
  Scabrin, 936
  single oil and pyrethrum, 117
  sulphur, 146, 1085
  sulphur dioxide, 1084
  sulphur dusts, 792
  TDE, 64
  technical BHC, 1222
  TEPP, 627, 795, 1244
  tetra-ethyl pyrophosphate, 933
  thiophosphate ester, 768
  toxaphene, 63, 64, 99, 117, 140, 1085, 1222, 1237
  toxaphene-DDT, 1237
  2,4-D, 795
  Vivifex, 385
Insolation and cotton, 1072
Intercropping soyabeans, 1041
Interplanting food crops with sugar cane, 604
Iodine index of linseed and 2,4-D, 807
Ion absorption
  of plants, 1180
  of roots lacking epidermis, 549
IPC, 625, 845, 1127, 1160, 1165, 1166
IPPC, 1130
Irrigated crops in Canada, 197
Irrigation
  and barley, 44
  and cotton, 590, 594, 595, 923, 1070
  and maize, 52, 621
  and oats, 627
  and peas, 414
  and rice, 73, 173, 367, 372
  and safflower, 621
  and sugar beet, 121, 281, 423, 589 759
  and wheat, 44, 315, 960
  control of water supplies, 178
  in French Sudan, 818
  in Morocco, 476
  in Persia, 630
  in South Africa, 1118
  in Southern Rhodesia, 826
  in USA, 826, 1231
  in Venetia (Italy), 183
  in West Australia, 593
  portable sprinkling, 485
  project in Malaya, 635
  rotations, 621
  underground pipe distribution, 925
Isopropyl N-phenyl-carbamate on wheat, beans, barley, and flax, 559
Isotope tagging, 893
Isotopic exchange, 589
Isotox, 63
Israel
  aerial spraying, 509
  Rehovot Agric. Res. Sta., 1042
  soyabeans, 1042
Italian ryegrass, 191
Italy
  agrarian reform, 290
  agricultural trade with France, 634
  agriculture, 260
  algae in rice fields, 379
  flax, 154
  hybrid maize, 351
  irrigation and drought control, 183
  land improvement, 187
  land reclamation in Venetia, 210, 211
  maize, 987
  mechanized agriculture, 179, 198
  rice in Modena, 371
  seed hemp, 800
  soyabeans, 400, 1043
  sugar beet, 120, 761
  sunflowers, 766
  use of single germ sugar beet seed, 122
Jamaica Dept Agric. Investigations 1948-9, 1233
Japan
  fertilizers and crop yields, 736
  leguminous weed seeds, 839
  rice insects, 80
Japanese barnyard millet, and boron, 523
Japanese beetle, 747
Jassid beetle of cotton, 452
Jassids of cotton, 791
Job's tears, varieties, 612
Johnson grass, 1133, 1134, 1142, 1161, 1237
Jute, 465, 801
  in India, 802
  in Pakistan, 802
  photoperiodism, 159, 464
  sowing date, 464
  temperature, 464
  trials, 602
  varieties,
    028....464
    064....464
    065....464
    0420....464
    0421....464
    345....464
Kaffir corn, 606
Kenaf—see *Hibiscus cannabinus*
Kerosenated rope, 385
Kidney bean, pest control, 612
  red, plant growth inhibitors fron 249
Kohlrabi, and DDT, 580
Laius femoralis, 173
Lakon's biochemical seed test, 317
Lalang, 836
Land clearance by fire in Sudan, 19
Land drainage, 470
Land improvement, in Italy, 187
Land management in Senegal, 817
Land management in Tanganyika, 17
Land reclamation in Italy (Venetia) 210, 211
Land resources in Nebraska, 828
Land use, 187
  in British Africa, 919
  in Gambia, 474
Lantana spp., 215
L. camara, 604
Laphygma spp., 920
L. frugiperda, 63, 64, 117, 1002
Laspeyresia nigricana, 752
Lateral application of herbicides, 1147
Lathyrus hirsutus, 410
  inoculation of seed, 410
  variety, Singletary pea, 410
L. maritimus, 839
L. ochrus, varieties, 923
Lattice designs, 914, 1228
Leaf blight of maize, 932
Leaf curl of cotton, 590
Leaf hopper, 117, 747
  rice, 1244
Leaf hopper jassid of cotton, 790
Leaf manuring, 858, 859
Leaf rust of barley, 678
Leaf rust of wheat, 622, 625, 649, 930
Leaf spot of groundnuts, 932
Leaf spot of peas, 109
Leafy spurge, 1233
Legumes
  and fertilizers, 282
  and fungi and stands, 279
  and soil fertility, 1121
  and 2,4-D, 215
  as green manure before maize, 607
  boron and growth, 418
  breeding, 327
  in rotation, 920
  root production, 247
  seed inoculation, 419
  varieties, 920
  weeds, 1149
Lema oryzae, 80
Lens culinaris, chemical composition, 571
L. esculenta, 534
Lepidium draba, 514, 591, 627, 1132, 1233
Lepidopterous larvae, 277
Lespedeza, before wheat, 620
L. bicolor, 839
L. cuneata, 839
L. pilosa, 839
L. tomentosa, 839
Lesser millet trials, 597

Lesser striped flea beetle, 578
Ley before maize, 352
LHH1, 1133, 1145
LHH1-ox, 1145
LHH7, 1145
Light
  and leaf composition, 531
  and nutrient uptake, 588
  and oat seedling growth, 538
  and response to growth substances, 892
  and wheat protein and starch content, 25
  intensity and maize development, 706
  sensitivity and seed treatment, 865
Light stage of plant development, 541
Lignin, fertilizers, 1226
Lima bean, chemical composition, 571
Lime, 279, 471
  on cotton, 278
Linaria, 504
Linseed, 167, 281, 466, 804, 923
  Alternaria lini, 808
  as cover for sugar beet, 429
  Botrytis cinerea, 808
  development, 162
  disease resistance, 162
  Heliothis armigera, 577
  in Holland, 806
  in Madagascar, 805
  in Mauritius, 604
  marchitamiento, 1097
  oil content and maturity, 808
  pasmo, 1098
  phenological behaviour, 163
  phosphate, 595
  PK, 589
  seed composition and water supply, 240
  seed rate, 595
  seed soaking in nutrient solution, 599
  seed treatment, 1098
  sowing date, 595, 1097
  spacing, 604
  sulphur and nitrogen metabolism, 852
  2,4-D and oil content, 807
  varieties, 594, 595, 596, 599, 808
    Benvenuto Labrador....162, 1097
    Buck 3....162, 163, 1097
    Buck 113....163
    Buck 114....163
    Entre Ríos....162, 1097
    Klein II....162, 163, 1097
    La Previsión 18....163
    Poblacion Facultad....163
    Punjab....604, 920, 1238
    Querandi M.A.,....162, 807, 1097
    Rio....1238
    Royal....604, 1238
    Turkey Winter....1237
  weed control, 508
  weeds, 808
Linum usitatissimum—see Flax for fibre, Linseed for oil
Lion oil, 1145
Lion oil LHH1, 1146
Lissorhoptrus foveolatus, 383
Locusts in Persia, 1250
Locusts (yellow-winged), 912
Lodging of barley, 625
Lodging of wheat, 23
Lombardy, cereals, 633
Lonchocarpus, 578
Longevity of maize seed in storage, 282
Loose kernel smut of Johnson grass, 363
Loose smut of barley, 345, 933
Loose smut of wheat, 20, 318, 617, 643
Loranthus spp., 591
Lotus corniculatus, 839
Low temperature resistance, cereals, 33
Loxostege similalis, 196
Lucerne, 269, 276, 469, 1070
  and BHC, 250
  and succeeding crops, 276
  root production, 247
Lunasan, 1034
Lupin(s), 189, 1121, 1124
  viability of seed, 535
  blue, as green manure crop, 53
  sweet, and cereals, 823
Lupins, yellow sweet
  bitter seeds, 417
  inoculation, 1061
Lupinus albus, 1205
  shoot apex and differentiation, 870
  metabolism and metalic chlorides, 860
L. angustifolius, 535
L. luteus,—see lupins, yellow sweet
Lychnis githago, 831
Lysine, 703
Machinery for dealing with combined straw, 193
Macrophomina phaseoli, 147, 1017
Macrosiphum pisi, 752
Madagascar, linseed, 805
Magnesium, 622, 861
  and flax, 799
  and N fixation in soyabeans, 1046
  deficiency of rye, 94
Maize, 54, 202, 585, 931
  after groundnuts, 594, 595
  after leguminous green manure, 607
  after ley, 352
  after lucerne and/or grass, 276
  after lupins, 189
  after blue lupins, 53
  after *Melilotus alba*, 189
  after *Pennisetum purpureum*, 920
  after pigeon pea, 920
  after tobacco, 608
  altitude and yield, 627
  amino acids in grain, 704
  and BHC, 250
  and climate, 281, 358
  and mound cultivation, 482
  and sesame, 608
  and 2,4-D, 226
  armyworm, 63, 920
  bacteriosis, 1001
  bisexual inflorescence, 520
  bordered by soyabeans, 1234
  breeding, 586, 622, 932
  carbohydrate formation, 531
  carotene content, 1189
  catalase activity, 705
  caterpillars, 1002
  charcoal rot, 1000
  chemical composition, 571
  clipping, 1007
  conservation, 1011
  conservation in husk, 1012
  continuous cropping, 920
  corn-borer, 930
    control by electric devices, 62
  corn rootworm, 359
  cost of production in Angola, 488
  cover crops, 932
  cutting, 279
  cutworm control, 63, 281
  cytochrome oxidase in embryos, 868
  determination of maturity, 65
  development, 65, 1006
  development and light intensity, 706
  disease resistance, 60
  diseases in Indiana, 697
  drought and flowering, 1008
  drying, 281
  dwarfing, 357
  earworm, 117, 1237
  effect on subsequent wheat crop, 622
  electro-magnetic treatment of pollen, 67
  emergence, after storage, 58
  estimation of leaf area, 537
  European corn borer, 61, 622, 928, 989
  fertilizer placement, 53, 282, 930
  fertilizers, 52, 277, 278, 283, 621, 707, 922, 983, 1240
  for pig fattening, 709
  food synthesis, 279
  foot rot, 999, 1000
  geotropism, 621
  germination, 281, 690, 865, 930
  green manuring, 1240
  growth inhibition, 703
  Heliothis armigera, 509
  herbicides, 1150, 1151
  hybrid(s), 688, 692, 1246, 1249
    in El Salvador, 995
    in Europe, 288
    in Italy, 351
    inspection, 690
    in Uruguay, 991
  improvement, 277, 281
  in Algeria, 51
  in Angola, 1010
  induced parthenocarpy, 536
  in El Salvador, 983
  in France, 988
  in French Empire, 348
  in French Equatorial Africa, 821
  in Gambia, 474
  in Holland, 686, 710
  in Illinois, 693, 694
  in Indiana, 354
  in Italy, 987
  in Lombardy, 633
  in Morocco, 937
  in Nigeria, 636
  in Orange Free State, 182
  in Portugal, 990
  in rotation, 265, 337, 490, 590, 606, 821, 920
  insecticides, 930
  in South Dakota, 695
  intercropped with beans, 983
    with potato, 687
    with tung, 608
  interplanted in soyabeans, 932
  irrigation, 52, 281, 621
  isolated root growth, 555
  leaf blight, 930, 932
  leaf manuring 858, 859
  lepidopterous larvae control, 64
  light sensitivity, 865
  longevity of seed in storage, 282
  maturity of seed, 696
  maturity for harvesting, 1232
  meadow nematodes, 698
  mechanical harvester, 69

  - mechanical injury to seed, 696
  - mixed cropping, 481
  - moisture content and germination, 930
  - morphology of ear and tassel, 700
  - moulds in storage, 279
  - niacin content, 623, 734, 867
  - nitrogen content, 281, 1234
  - NPK, 337, 595, 931, 932
  - oil content, 932, 1234
  - origins, 708, 1004, 1005
  - pantothenic acid content, 623, 734
  - penetration of 2,4-D in seed, 842
  - pest control, 277, 612
  - pH of nutrient solutions, 862
  - physiological action of herbicides, 66
  - picado, 1003, 1011
  - plant material and growth, 621
  - plant population, 618, 621
  - potassium nutrition, 528
  - production, 52
  - protein, 282
    - content, 617, 704, 932, 1232, 1234
    - formation, 531
  - radiated energy treatment of pollen, 67
  - resistance to low temperatures, 696
  - ridges, tied and untied, 920
  - root bug, 358
  - rootworm, 281
  - rotations, 822, 931
  - *Sclerotium bataticola*, 1000
  - seedling growth, 281
  - seed rates, 282, 932
  - seed storage, 58
  - seed treatment, 281, 612, 655, 696, 865, 910, 1035
  - seed viability test, 56
  - selection, 689, 702
  - shelled, conditioning of, 57
  - silage, 928
  - silk fly, 117
  - sod webworms, 281
  - soil microorganisms and growth, 621
  - soil status and yield, 349
  - sowing dates, 278, 983, 984
  - sowing rate, 617
  - spacing, 53, 594, 707, 983, 985, 986, 1234
  - stalk borer, 920
  - stalk rot, 932
  - storage, 59, 279
  - structure and reproduction, 360
  - TCA, 356
  - transpiration and growth substances, 890
  - trials, 597
  - 2,4-D, 623
  - varietal characters, 350
  - varieties, 17, 52, 269, 279, 280, 283, 353, 354, 357, 469, 570, 594, 612, 618, 623, 627, 692, 734, 987, 988, 989, 993, 1003, 1009, 1234, 1244, 1247
    - Amarillo Canario Klein....984, 985
    - Amarillo Klein,....984
    - Arno....686
    - Boone....60
    - Burma white....1244
    - Burma yellow....1244
    - Cedar....60
    - Celaya....707
    - Clinton....60
    - Colorado....60
    - Colorado Casilda (39) 65....984
    - Colorado Cuarenton Klein....984, 985
    - Colorado Forrajero....992
    - Colorado G. 39(65) M.A....999
    - Colorado Klein....984, 985, 991, 992, 994
    - Colorado La Estanzuela....991, 992
    - Colorado Manfredi, 984, 985, 999
    - Colorado Santa Fe No. 3....59
    - Control....60
    - Cornell, 29-3....928
    - Criollo....707
    - Cuban PD(MS)....983, 1240
    - Diente Blanco....992
    - Dixie 18....55
    - Double hybrid....606
    - Early yellow round C.B.....686
    - Empalizada,....1240
    - Fla W-1....55
    - Fla W-2....55
    - Funk G. 19....352
    - Funk G. 114....352
    - Georgia 101....278
    - Golden Bantam....67
    - Hawaiian No. 1....983
    - Hibrido No. 1. La Estanzuela....992
    - Hickory King....606
    - Insubria 1....691
    - Insubria 2....691
    - Insubria 156....691
    - Insubria 2201....691
    - Iowa 4316....352, 691
    - Jsy....1238
    - Kingcrost KO....352
    - La Lucilla No. 1....1011
    - Marano Vicentino....687, 701
    - Marian....60
    - Mass 62....928
    - Maygold 49....352
    - Midland, 986, 991
    - Minnesota 800....686
    - Miraflores....1240
    - MJ....1238
    - Mokant....67
    - Neosho....60
    - Nodak 203....686
    - Pearl of Cornell....686
    - Pfister....701
    - Pioneer....686
    - Potchefstroom Pearl....606
    - Quarantino....701
    - Rainbow....60
    - Rocamex H-307....707
    - Rocamex V-21....707
    - RVTM....1238
    - Santa Fe No. 3....992, 994
    - Saveiro....67
    - Seminano....67
    - Síntesis La Estanzuela No. 2....991
    - Síntesis No. 1. La Estanzuela....992
    - Tennessee 13....867
    - Texas 24....1237
    - Texas 26....996, 1237
    - Texas 28....996, 1237
    - Texas 30....996
    - U.32..352
    - Ulupilsen....1240
    - US 13....994, 1011
    - USDA-34....220
    - Venezuela 1....1240
    - Venezuela 3....983, 1240
    - Venezuela No. 3 x Empalizac....983
    - W22....226
    - W-464....997
    - W-464A....997
    - WF 9....226
    - Wisconsin 200....928
    - Wisconsin 240....686
    - Wisconsin 255....686
    - Wisconsin 300....928
    - Wisconsin 355....928
    - Wisconsin 400....928
    - Wisconsin 464....352
    - Wisconsin 692....928
    - Wisconsin 641 AA....999
  - vegetative cycle, 699
  - vegetative growth, 701
  - vernalization, 68
  - vitamin C and respiration, 878
  - weed control, 355, 507, 509, 618
  - weeds, 513, 838, 932, 1150, 1151, 1152 1153, 1154, 1155
  - yield forecasting, 361
  - yields, 206, 219, 220, 279, 280, 490, 617, 618
- Malaya
  - Dept Agric. Ann. Rep. 1949, 1244
  - investigations 1950, 602
  - irrigation project, 635
  - mechanization Quart. Prog. Rep. July-Sept. 1950, 601
  - rice, 719, 720
  - weeds, 836
- Maleic hydrazide, 888, 889, 1166, 1205
  - on sugar beet, 772
- *Malva* spp., 1160
- Malvaceae, 378, 776, 789
- Manganese, 930
  - and catalese activity in rice, 525
  - and growth stage in oats, 923
  - and photosynthesis, 526, 850
  - deficiency, 471, 588
    - in oats, 973
    - in wild oats, 973
  - ions, and vitamin C distribution, 534
  - nutrition, soyabeans, 1047
  - on crops, 282
  - on groundnuts, 931
  - on oats, 849
  - on soyabeans, 849
  - on sugar beet, 438
  - radio active, 1183
- Mangolds, 326
  - fertilizer placement, 480, 589
  - fertilizers, 757
  - flea beetle, 578
  - varieties
    - Frontenac....926, 927
    - Prince....927
    - Prince White Sugar....926
    - Tip Top....927
  - virus yellows, 430, 1064
- *Manihot utilissima*—see Cassava
- Manures—see Fertilizers
- Manuring of beans, 416
- Manuring of sugar beet, 423
- Marchitamiento of linseed, 1097
- Marginal land in Wales, 589
- Marginal land in Herefordshire, 191
- Mashlum, 416
- *Matricaria chamomilla*, 837
- Maturity of maize seed, 696
- Maturity of linseed, 808
- Maturity tests for harvesting peas and maize, 1232

Mauritius
  agriculture, 477
  Sugar cane Res. Sta. Ann Rep. 1949, 604
MCPA, 222, 414, 499, 509, 752, 1127
Meadow nematodes, 698
Measurements of weed seeds, 229
Mechanical counting of seeds, 257
Mechanical injury to maize seed, 696
Mechanized agriculture
  in Africa, 935
  in S. Italy, 179
  in Venetia, 198
Mechanized cultivation
  and soil erosion, 487
  and soyabean yield, 507
  of cotton, 1073
  of rice, 1244
Medicago sativa—see Lucerne
Melampsora lini, 162
Melandrium, 541
Melastoma malabathricum, 836
Melilotus alba, 189
  extract, 281
  var. Evergreen, 883
Mercuric oxide as catalyst, 235
Mergamma, 732
Metabolism of plant cells, 874
Metabolism of wheat 962
Metallic change, 860
Metallic chlorides and metabolism of *Lupinus albus*, 860
Meteorological Institutes in Pakistan, 639
Meteorology and crop evaporation, 588
Methods of growing rice in sand culture, 84
Methoxone, 219, 251, 378, 835, 1166
Methoxychlor, 63, 64, 117
Methoxy DDT, 63, 64
Methyl bromide, 1040, 1136
Methyl formate, 1040
Metoxone, 1151
Mexican bean beetle, 747
Mexican weed, 1161
Microbial activities and plant nutrition, 588
Microclimate, 279, 1218
Micro-fertilizers, heteroauxin, 546
Microlespedeza striata, 839
Micro-nutrient deficiencies, 471
Micro-nutrition, 922
Mildew of barley, 625
Millet(s)—see also under specific names
  carbonic anhydrase content, 237
  Hispa spp., 384
  in Gambia, 474
  in Gujerat, India, 713
  in Nigeria, 636
  in North Africa, 473
  in Orange Free State, 182
  in rotation with cotton, 188
  in USA, 712
  ridges, 920
  sowing date and disease resistance, 18
  tie-ridging, 590
  varieties, 920
    Kamalinskoe 591....1013
    Kazanskoe 506....1013
Mimosa, 1175
M. invisa, 215
M. pudica, 378, 836
Mineral content and growth stage of oats, 923
Mineral deficiencies, 471, 596
Mineral nutrition, bibliography, 1181
Minerals, and soyabean, 100
Minimum distances between related root crops for seed in Sweden, 143
Minor elements, 930
  and crops, 282
  and wheat, 595
Mintweed, 591
Mistletoe, 591
Mites of cotton, 452
Mixed cropping, 597, 922
  in India, 481
  of oats and peas, 332
Moisture conservation, 281
Moisture content and maize germination, 930
Moisture content of rice grain, 267
Mole cricket, 63
Molybdenum, 1183
  and beans, 595
  and flax, 799
  and growth stage in oats, 923
  and nitrogen metabolism, 851
  and wheat, 1184
  uptake, 588
Morocco Agric. Res. Papers 2, 1949, 613
  cotton, 777, 1070
  irrigation, 476
  maize, 937
  reclamation of the 'merdjas', 494
  rice, 367 368,
Morphology
  maize (ear and tassel), 700
  rice, 1025
  wheat, 957
Mosaic
  of cassava, 920
  of sugar beet, 431, 1065
  of wheat, 1234
Mottling of wheat, 595
Moulds in stored maize, 279
Mound cultivation in Tanganyika, 482
Movement of 2,4-D and TCA in soil, 886
Mozambique, cotton, 1082
Mulching, 608
Mulch tilage, 932
Multi-flowered cereal spikelets, 346
Mustard, 281
  anti-thiamine factor, 1198
  erucic acid, 287
Mustard (white), 168
  yields of oil and protein, 468
Mustard (yellow), 167
  and hormone herbicides, 223
  BHC, 562
Myzus persicae, 130, 429, 768, 1100
NA, 536
  and flax root growth, 552
  on *Phaseolus aureus*, 1058
  on *Ph. vulgaris*, 1058
Naphtha, 1133, 1147
Natural crossing in cotton, 794
Nectar secretion, 861
Nematocides, 698
  dibromobutene, 1221
Nematodes
  on rice, 387
  on sugar beet, 423, 432
Neobagous spp., 383
Neomarica northiana, 1125
Neoplastic growth, 875
Nephotettix bipunctatus, 1244
Net blotch of barley, 622
Niacin in maize, 623, 867
Niacin in cereals, 734
N.I. Ceresan, 256, 335, 626
Nicotine, 146, 433, 578
Nicotine sulphate, 768
Niger delta
  cotton, 188
  green manures, 188
  rice, 188
Nigeria
  agricultural development, 636
  fibre industry, 637
Nilaparvata lugens, 80
Nitragin inoculation of pea seed, 412
Nitrogen
  and barley, 46, 347
  and cotton, 780
  and excised pea root growth, 556
  and flax, 799
  and maize, 932, 1234
  and rice, 717
  and soyabeans, 617, 1234
  and sugar beet, 439, 589
  and wheat, 324, 595, 963
  deficiencies, 471
  influence, on branching of rye, 543
  metabolism
    and molybdenum, 851
    and sulphur, 852
    of barley, 683
  nutrition and supply in flooded soils, 73
No. 5400, 278
Nodulation of soyabeans, 401, 1045, 1196
Nonic 218, 1169
Non-sequential estimation, 917
North Africa, cereals, 473
Northern Ireland, Rep. on oat variety trials, 967
Northern Rhodesia Dept Agric. Ann. Rep. 1949, 606
Noxious effects of BHC, 250
NPK, 622
  beans, 416
  buckwheat, 330
  maize, 595
  oats, 604
  peas, 414
  rice, 367, 391, 604
Nu Green, 85
Nutgrass, 356, 591, 836, 1133, 1135, 1136, 1142
Nutrient content of air and rain, 254
Nutrient supply of autumn-sown crops, 195
Nutritive value
  of cereal straws, 735
  of soyabean seeds, 281
Nyasaland Dept Agric. Ann. Rep. 1948, 608
Oats
  and BHC, 250, 562
  and boron, cobalt, and copper, 231
  and hormone herbicides, 224
  and Sinox, W 217
  and 2,4-D, 217, 226, 844, 1161
  Avena byzantina, 970
    var. Buck 20....33, 35, 37
    var. Buck 152....35, 37
    var. La Previsión 13....35, 36, 37
  A. byzantina × *A. fatua*, 34
  A. strigosa, 970
  black rust, 670
  blindness, 42

  breeding, 327, 620, 670
  comparative performances, 40
  covered smut, 671
  crown rust, 972
  degeneration to wild oats, 338
  disease resistance, 18, 60, 278, 670, 972
  eelworm, 1029
  fertilizers, 398
  frit flea, 670
  grey speck, 589
  growth of excised roots, 554
  Helminthosporium blight, 1232, 1237
  in Australia, 173
  in Austrian alps, 670
  in North Africa, 473
  in rotation, 173, 337, 596
  in Scotland, 472
  irrigation, 627
  light and seedling growth, 538
  manganese, 849, 973
    and grey speck, 589
  mechanical counting of seed, 257
  mineral content and growth stage, 923
  mixed with barley, 268
  mixed with beans, 416
  mixed with peas, 332
  molybdenum, 851
  niacin, 734
  NPK, 604
  nutritive value of straw, 735
  on Australian salt land, 326
  pantothenic acid, 734
  Parathion, 1206
  pH of nutrient solutions, 862
  place in farming system, 192
  protein quality, 339
  response to 2,4-D, 40
  root growth in subsoil, 1194
  root production, 247
  seed rate, 932
  seed treatment, 256, 335, 336, 571, 1034, 1036
  seed viability, 41
  smut, 335, 336
  soil temperature and development, 1193
  sowing date, 18, 40
  sterility, 397
  sulphur and nitrogen metabolism, 852
  2,4-D, 505, 506
  varieties, 17, 38, 43, 279, 282, 283, 331, 469, 570, 594, 595, 596, 618, 627, 734, 918, 969, 1030, 1166, 1247, 1248
    Abegweit (Vanguard × Erban cross)....927
    Aberystwyth S.84....3
    Aberystwyth S.147....45
    Aberystwyth S.172....45
    Aberystwyth S.225....45
    Abundance....32
    Advance....39, 667
    Afterlea....45
    Ajax....40, 268, 622, 625, 665
    Alaska....927
    Andrew....665, 666, 667, 972
    Anthony-Bond × Boone....39
    Arlington....278
    Bagé Sel. Klein....33
    Beaver....268, 927
    Benton....39, 666, 667, 930, 972
    Black Tartarian....3, 32
    Blenda....941
    Bond....39, 625, 667
    Bonda....666, 667, 972
    Bond-Ingold....930
    Bonham....39
    Borris Opus....333
    Borris Opus II....333
    Branch....972
    Buck 20....33
    Ceirch-du-bach....32
    Cherokee....39
    C.I. 5013....930
    Clinton....39, 40, 48, 226, 256, 625, 666, 667, 849, 930, 972, 1166
    (Clinton × Santa Fe) × Clinton 39
    Colo....667
    Colorado....40
    Columbia....666, 930, 972
    Craigs Afterlea....3
    De Sota....949
    Eagle....3, 32, 45
    Early Miller....3
    Eaton....39, 667
    Eho....669, 968
    Englebreckt....918
    Erban....40, 927
    Exeter....665
    Forkedeer....949
    Fortune....622
    Fransk Svarthavre (French Black-bulled)....334
    Frazier....923
    Fulgrain....278
    Fulwin....923
    Garry....665, 972, 1232
    Glasnevin Triumph....967
    Golden Rain....3, 941
    Golden Rain II....32, 668, 669
    Gopher....40, 622
    Gullregn II (Golden Rain II), 334
    Hastings 100-Bushel....278
    Hinensis....338
    Iowa 105....40
    Jøtul....334
    Kent....39
    Klein Mar....33, 35, 36, 37
    Lanark....665, 971
    La Previsión 13....33
    Lochows Gelbhaffer....941
    Maldwyn....3, 32
    Marion....666, 972
    Marvellous....3
    Merkur....334
    Milford....3, 32, 45
    Mindo....39, 666, 667, 972
    Missouri 0-205....972
    Mohawk....39, 40, 625
    Mo. 0-200....930
    Mustang....1237
    Nemaha....39, 505
    Nortex....278
    0(18)3....34
    01509....941
    Onward....3, 32
    Pajbjerg Rex....333
    Picton....45
    Radnorshire Sprig....918
    Rainbow....622
    Red Rustproof....1237
    R. L. 1574 × Ajax....665
    R.L. 1574 × Roxton....665, 1232
    Rygja....334
    S.84....32, 967
    S.172....32
    S.220....32
    Sac....39, 667
    Scotch Potato....32, 589
    Seger....941
    Shelby....39, 40
    Sisu....668, 669, 968
    Sol II....669
    Sølvhavre I (Silver Oat 1)....334
    Sølvhavre II (Silver Oat II)....334
    Stål....218
    Stanton Str. 1....949
    Star....3, 32, 589
    Strigosa 3381....970
    Sun II....3, 32, 45, 967
    Supreme....3, 32
    Svalöf's Ørn (Eagle)....334
    Tama....972
    Tammisto Strain 02272....688
    Tennex....949
    Terruf....278
    Traveler....949
    Trojan....923
    Vanguard....40, 268, 665
    Vanguard × Erban....665
    Vasa (White Banner)....668
    Victorgrain....278
    Victoria....43
    Victory....32, 665, 926, 927, 1232
    Wintok....883, 949
    Wongan....326
    Zephyr....665, 667
    3033-S15....665
  weed control, 217, 280, 507
  yellow rust, 606
  yields, 206, 728
Oceania
  flora and useful plants, 846
  Gossypium spp., 786
Ochsenheimeria sp., 975
Oil content
  of linseed, 808
  of linseed, and 2,4-D, 807
  of maize, 932, 1234
Oil crops, 923
  autumn sowing, 195
  Camelina sativa, 1107
  Crambe abyssinica, 812
  in France, 1108
  turnip rape, 811
O-isopropyl N-phenyl carbamate, 833
O-isopropyl N-(-3 chlorophenyl) carbamate, 833
Old-man saltbush, 326
Onion extract and germination of wheat and rye, 864
Onobrychis sp., 1192
Ophiobolus graminis, 22, 23, 596, 730
O. miyabeanus, 380
Opium poppy—see Poppy
Orange Free State, marginal areas, 182
Orfed wheats, 320
Origins
  of African crops, 900
  of cultivated plants, 230
  of maize, 708, 1004, 1005
Ornithine, 703
Orobanche crenata, 415
Oro wheats, 320
Oryza barthii, 188, 390
O. breviligulata, 390
O. fatua, 390
O. glaberrima, 366, 390, 900
O. madagascariensis, 390
O. minuta, 390

- *O. officinalis*, 390
- *O. sativa*—see Rice
- *Oscinella frit*, 42
- *Oscinis* sp., 670
- Osmosis in plant cells, 872
- Ox-eye, 936
- *Oxalis*, sp., 1160
- Oxydase activity in groundnuts, 104
- Oxydase activity in *Vicia faba*, 119
- Oxygen and soyabean nodulation, 1196
- Oxygen supply to roots, and plant growth, 553
- *Oxytenanthera abyssinica*, 169
- Pacific mite, 792
- Pakistan
  - Cotton Research Institute, 638
  - jute, 802
  - Meteorological Institute, 639
- *Panicum* sp., 215
- *P. colonum*, 173
- *P. miliaceum*, 473
- Panogen, 256, 335, 336, 622, 932
- Panogen, 8, 671, 1232
- Pantothenic acid in cereals, 734
- Pantothenic acid in maize, 623
- *Papaver* sp. 541, 675, 1192
- *P. rhoeas*, 837
- *P. somniferum*—see Poppy
- Paraoxon, 130
- Parathion, 63, 64, 117, 130, 358, 622, 792, 796, 930, 1064, 1222, 1244
  - and oats, 1206
- Paris Green, 924, 1085
- Parthenocarpy induced in maize, 536
- Partridge peas, erosion control, 490
- Pasmo of linseed, 1098
- *Paspalum* sp., 263, 355
- *P. dilatatum*, 852
- *P. scrobiculatum*
  - varieties
    - Baroda 8....713
    - Baroda 15....110
    - Vyara 31....110
- *P. vaginatum* on Australian salt land, 326
- Pasture in rotation, 596
- P-chlorophenoxyacetic acid, 890
- **Peas**, 1121—see also specific names
  - and BHC, 250
  - and boron, cobalt and copper, 231
  - and growth substances, 1200
  - and manganese and molybdenum, 1183
  - and NPK, 414
  - chemical composition, 571
  - control of *Stellaria media*, 228
  - cultivation, 411
  - excised root growth, 556
  - fertilizer placement, 414, 480, 589
  - for drying, 413
  - fungicides, 414
  - growth substances and split stems, 897
  - *Heliothis armigera*, 577
  - induction of lateral roots, 551
  - in rotation, 265, 622
  - iron uptake, 1182
  - irrigation, 414
  - *Laspeyresia nigricana*, 752
  - leaf and pod spot, 109
  - *Macrosiphum pisi*, 752
  - maturity for harvesting, 1232
  - mixed with beans, 416
  - mixed with oats, 332
  - nitragin inoculation of seed, 412
  - pest control, 414
  - physiology of root development, 245
  - potassium nutrition, 528
  - root length, 881
  - seed rate, 414
  - seed treatment, 109
  - seed treatment against aphids, 43
  - sheller, 107
  - singletary, 410
  - sowing date, 414, 596
  - sowing depth, 414
  - spacing, 414
  - varieties, 108, 595
    - Arthur....268, 926
    - Chancellor....268, 926
    - Early Blue....268, 926
    - Emigrant....414
    - H277-19A....278
    - Kapital....412
    - Servo....414
    - Viktoria Mandorfskaja....412
    - Vjatskiĭ 39....412
    - Zelka....414
    - 1187-C....268
    - 1873-K....268
    - 2221-D....268
  - weed control, 414
  - weeds, 752
  - wild oats and IPC, 845
- *Pectinophera gossypiella*, 454
- *Pegomia hyoscyami*, 769
- *Pempherulus affinis*, 145
- *Penicillium purpurogenum*, 255
- *Pennisetum*
  - in French West Africa, 362
  - millets of African origin, 900
  - water requirements, 362
- *P. mollissimum*, 362
- *P. purpureum*, 583, 590
  - before maize, 920
- *P. spicatum*, 612
- *P. typhoideum*, 597
  - mixed cropping, 481
- Pentachlorophenate, 275
- Pentachlorphenol, 836, 1160, 1237
- Penta dinitro compounds, 1145
- Perennial broad-leaf vine, 1147
- Perenox, 1244
- *Perilla nankinensis*, 540
- *P. ocymoides*, 281
- Persia, agriculture, 630
- Persia, locusts, 1259
- Persistence of insecticides in soil, 1222
- Persistence of 2,4-D in soil, 1170
- Pest control, 612
  - in cotton, 278, 453
  - in peas, 414
  - in rice, 598
- Pestox III, 1064
- Pests, 117—see individual names
- Petroleum as herbicide, 1167
- Petroleum oils, 1165
- pH
  - of nutrient solutions, 862
  - of soyabeans, 1158
  - range for rice, 392
- *Phacelia*, 271
- *Phalaris canariensis*, 473
- *Phaseolus*
  - carbohydrate and protein formation, 531
  - in Canada, 111
  - seed composition and water supply, 240
  - varieties,—111
- *Ph. aconitifolius*, 534
  - varieties
    - Baleswar 12....110, 713
    - Medhi 33....110, 713
- *Ph. angularis*, 612
  - varieties, 612
- *Ph. aureus*
  - and NA, 1058
  - and photoperiodism, 244
  - and 2,4-D, 1058
  - varieties
    - I.P.28....244
    - Sona Mung....244
  - vernalization, 244
- *Ph. coccineus*, chemical composition, 571
- *Ph. lunatus*, DDT and germination 753
- *Ph. radiatus*, 534
  - varieties
    - Chinese strain No. 1/49....1056
    - No. 54....1056
    - No. 509....1056
- *Ph. vulgaris*
  - and NA, 1058
  - and 2,4-D, 1058
  - *Bruchus obtectus*, 612, 754
  - catalase activity, 242
  - chemical composition, 571
  - critical energy, 242
  - germination and seed treatment, 865
  - in Belgian Congo, 754
  - isopropyl n-phenyl-carbamate, 559
  - leaflet abscission, 871
  - light sensitivity and seed treatment, 865
  - phenoxyacetic acid, 559
  - seed composition and water supply, 240
  - seed viability test, 241
  - varieties, 612
    - Kalera....754
    - Wulma....754
  - water consumption, 248
- Phasic development of sugar beet, 132
- Phenol, 654
- Phenoxyacetic acid on wheat, beans, barley and flax, 559
- Phenoxylen, 1247
- Phenylmercuric acetate, 1166
- Phenyl thiohydantoic acid, 1232
- Philippines
  - cotton, 783
  - rice, 721
- *Pholiuris incurvis*, 326
- *Phoma*, 382
- *Phormium tenax*, 624
- Phosphate
  - availability to cereals, 596
  - deficiencies, 471
  - on barley, 347
  - on groundnuts, 593, 594
  - on linseed, 595
  - on oats, 337
  - on singletary peas, 410
  - on wheat, 595
- Phosphatic fertilizers, 1185
- Phosphorus
  - content of wheat grain, 958
  - deficiency in soyabeans, 527
  - in plants, determination of, 896
- Photo-electric calorimeter, 896
- Photomicrography, 567
- Photoperiodism
  - and jute, 159, 464
  - and *Phaseolus aureus*, 244

  and rice, 389
  and wheat, 26, 662, 663
  rôle of carbonic anhydrase, 237
  rôle of roots, 540
Photosynthesis
  and ascorbic acid, 30
  and groundnuts, 104
  and manganese, 526, 850
  daily fluctuations in sugar beet, 436
Phygon, 256, 377, 910, 932
Phygon-XL-DDT, 983, 1035
Phyllotreta undulata, 578
Physiological determination of crop fertilizer requirements, 897
Physiology of pea root development, 245
Physiology of pulses, 597
Phytophaga destructor, 930
Phytotoxic extracts from *Cirsium arvense* and *Convolvulus arvensis*, 560
Picado, 1003
  of maize, 1011
Pigeon pea, 204
  as cover crop, 608
  before maize, 920
  chemical composition, 571
  mixed cropping, 481
  TCA, 356
  varieties
    Degham 35....110
    Vijapur 49....110
  with groundnuts, 597
Pink bollworm of cotton, 454
Pioneer cropping in Herefordshire, 191
Piricularia oryzae, 382, 1244
Pisum arvense, 534
P. sativum, 1155, 1192—see also Peas
Plant breeding, 586
  new wheat varieties, 6
  problems, 327
Plant collecting in S. America, 263
Plant damage by air pollution, 576
Plant disease resistance, 1199
Plant food deficiencies, 927
Plant growth and tillage, 588
Plant growth inhibiting substance, 887
Plant growth inhibitors from red kidney bean seeds, 249
Plant hormone(s)
  and vitamin C formation, 534
  Aumentan, 655
  Behmisina, 655
Plant improvement work, Angola, 581
Plant ion absorption, 1180
Plant material and maize growth, 621
Plant metabolism and viruses, 596
Plant nutrition, 588, 1214
  use of radio-active tracers, 232
Plant population, maize, 621
Plant response
  to climate, 243
  to herbicides, 1143
  to insecticides, 1222
Plant rigidity, 1195
Plant roots and cation exchange, 550
Plant use of nitrogenous compounds, 236
Planting groundnuts, 1244
Planting sugar beet, 121, 281
Plants in Uruguay, 1177
Plasmodiophora brassicae, 142, 927
Platyedra, 590
P. gossypiella, 789, 1084
Plot size for trials, 90
Ploughing and harrowing after root crops, 483
Ploughing depth in Senegal, 825
Ploughing in combined straw, 193
Pocket sowing of sugar beet, 763
Pod spot of peas, 109
Pollen grains, germination of, 1192
Polybor, 621
Polybor-chlorate, 621
Polyethylene glycol, 1154
Polygonum convolvulus, 214, 501
P. lapathifolium, 214, 501
Polyspora lini, 1094
Poppillia japonica, 747
Poppy
  root length, 881
  varieties, 1247
Poppy (opium), 167
  varieties
    Eckendorfer....166
    Mahndorfer....166
    Mansholt....166
    Øtofte....166
    Pajbjerg....166
    Peragis Weihenstephan....166
    Strubes....166
Poppy (white), and hormone herbicides, 223
Portugal, maize, 990
Portugal, seed exchange, 1253
Portula oleracea, 215, 1147
Potassium absorption, barley roots, 684
Potassium and plant nutrition, 528
Potassium cyanate, 1165
Potassium ethyl xanthate, 233
Potassium hydrazide and testing cooked rice, 726
Potassium K content, spectrochemical determination, 1211
Potash
  deficiencies, 471
  on barley, 347, 589
  on cotton, 590
  on groundnuts, 593, 594
  on linseed, 589
  on oats, 337
  on sugar beet, 589
Powdery mildew, 980
  of barley, 678
  of wheat, 649
Pratylenchus spp., 698
Precision sowing of sugar beet, 137, 139, 140, 271
Pre-emergence spraying, 226
Press-wheel, 136
Prodenia eridania, 63
P. litura, 509
Prosopis, 509
Protein
  in barley, 622
  in groundnut, 407
  in maize, 282, 617, 704, 932, 1232, 1234
  in stem and water supply, 240
  of wheat, and effect of light, 25
Protein formation and light, 531
Protein pellets from sugar beet tops, 629
Protein quality of oats, 339
Prunella asiatica, 841
Pseudomonas phaseolicola, 1232
Puccinia spp., 397
P. aristida, 281
P. coronata var. *avenae*, 39, 60
P. glumarum, 8, 1246
P. graminis, 8, 311, 670, 948
P. triticina, 8, 948, 1246
Pulse crops, carotene content, 1189
Pulses in Gujerat, India, 713
Pulses, physiology, 597
Purple stain of soyabeans, 746
Pyrausta sp. 1244
P. nubilalis, 61, 62, 69, 1249
Pueraria thunbergiana, 220
Pyrethrin, 64
Pyrethum, 117, 936
Pythium graminicola, 48
P. ultimum, 147, 1232
P^{32} as a tracer, 932
Quack grass, 623, 1128
Qualitative control of seeds in Britain, 934
Queensland
  cotton jassids, 791
  Dept Agric. Stock Ann. Rep. 1948-9, 594
  Dept Agric. Stock. Ann. Rep. 1949-50, 595
  groundnuts, 1055
  locust, yellow-winged, 912
  seed production, 998
Rabbit damage to winter corn, 322
Radiant energy corn-borer traps, 282
Radiated energy treatment of maize pollen, 67
Radiation effects of radioactive tracers, 232
Radioactive calcium, 105
Radioactive isotypes, 553
Radioactive manganese, 1183
Radioactive techniques, 279
Radioactive tracers, 589, 1178
  in plant nutrition studies, 232
Radioactive 2,4-D absorption and translocation by beans, 118
Radioactivity, 1178
Radio-autographs, 1183
Radio frequency heat drying of rice, 619
Radish, 167
Ragweed, penetration of 2,4-D in seed, 842
Rain, nutrient content, 254
Rainfall
  and cotton yield, 590
  and impurities in sugar beet, 771
  and wheat, 294, 588, 923
  correlation with yield of irrigated cotton, 153
  distribution in the USA, 184
  in French Sudan, 177
  in Persia, 630
Random lattice design, 914
Rape, 167, 191, 810, 861, 1107
  DDT, 580
  erucic acid, 287
  fertilizers, 1105, 1106
  in Sweden, 165
  metabolism of root tissue, 246
  oil content, 165
  oxidation of ascorbic acid in root tissue, 246
  root production, 247
  seed, 923
  seed composition and water supply, 240
  sowing date, 1105
  tetraploid form, 809
  varieties
    Gülzow....1105

    - Lembkes....165
    - Senraps....165
    - Strain 15....809
    - Strain 26....809
    - Svalöf Matador....165
  - yields of oil and protein, 468
- *Raphanus*, 504
- *R. raphanistrum*, 514, 1162, 1247
- *R. sativus*, 865
- Raphone, 604
- Rats, 599
- Raunkiaer's hydrothermic graph, 1217
- RB, 383, 386
- Reclamation
  - of eroded arable in Australia, 209
  - of the 'merdjas' in Morocco, 494
- Red boll-worm of cotton, 452
- Red clover, 226, 469, 1124
- Red leaf disease of cotton, 600
- Redox potential, 526
- Red rays and leaf composition, 531
- Redroot pigweed, 1163
- Red spider, 113, 130, 747
- Red spider of cotton, 452
- Reductase in soyabean sprouts, 533
- Reports, 269
  - Argentina
    - Agricultural improvement 1949, 616
    - Dir. Gen. Fom. Agric. 1949, 1241
    - 4th Conference on cereals 1950, 264
    - 5th Conference on maize 1950, 1242
    - Tucumán Agric. Expt Sta. Rep. 1947, 615
  - Australia
    - Comm. Sci. Industr. Res. Ann. Rep. 1949, 592
    - CSIRO Ann Rep. 1950, 591, 923
  - Austria, State Inst. for Alpine Agric., Admont 1948, 1247
  - Basutoland
    - Dept Agric. 1948, 265
    - Dept Agric. 1949, 605
  - Belgian Congo, INEAC Ann. Rep. 1949, 612
  - British Commonwealth Specialist Conference in Agriculture 1949, 588
  - British Guiana
    - Dept Agric. Admin. Rep. 1948, 266
    - Dept Agric. Admin. Rep. 1949, 267
    - Dept Agric. Ann. Rep. 1949, 610
  - Canada
    - Charlottetown Dom. Exptl Sta. Prog. Rep. 1937-47, 822, 927
    - Dept Agric. Nat. Res. Counc. Rep. on oat varieties 1950, 665
    - Dept Agric. Rep. on wheat varieties 1950, 306
    - Dept Agric. Nat. Res. Counc. Rep. on wheat varieties 1950, 647
    - Fort Vermilion Dom. Expt Substa. Prog. Rep. 1939-48, 926
    - Fort William District Expt Sub-Sta. Rep. 1937-47, 268
    - Minist. Agric. Rep. 1950, 1232
    - Ottawa Central Exptl Farm Prog. Rep. 1938-47, 1233
  - Cyprus
    - Quart Rev. No. 22, 1950, 269
    - Quart. Rev. No. 24, 1951, 1246
  - East Africa Groundnut Scheme 1949, 406
  - El Salvador
    - Centro Nac. Agron. Rep. 1944-8, 1239
    - Centro Nac. Agron. Rep. 1949, 1240
  - Fiji, Dept Agric. Ann. Rep. 1949, 924
  - Finland, Hankkija's Plant Breed. Sta. 1946-9, 1248
  - France, OEEC Agric. Advisory Services in Europe, 270
  - French Africa, Inst. Res. Coton et Textiles exotiques 1948-9, 921
  - Great Britain
    - Empire Cott. Gr. Corp. 1948-9, 590
    - Peterborough, Home Grown Threshed Peas Joint Committee 1945-9, 414
    - Rothamsted Expt Sta. Rep. 1949, 589
  - Hawaii, Univ. Agric. Expt Sta. Rep. 1950, 925
  - Holland
    - Commission for Sugar Beet Cultivation 1949, 271
    - 14th NaCoBrouw Yearbook 1950, 933
  - Hong Kong Dept Agric. Ann. Rep. 1950, 1243
  - India
    - Dept Agric. Uttar Pradesh, Ann. Admin. Rep. 1949, 1245
    - Indian Agric. Res. Inst. Sc. Reps. 1947-8, 922
    - Indian Cent. Cott. Committee 1948-9, 600
    - Indian Counc. Agric. Res. Ann. Rep. 1948-9, 597
    - Inst. Plant Industr., Indore 1949, 599
    - Rice Res. Inst., Cuttack, 1946-8, 272
    - Rice Res. Sta., Cuttack, Ann. Rep. 1948-9, 598
  - Italy, Italian Sugar Industry. Sugar beet experiments 1949, 273
  - Jamaica Dept Agric., investigations 1948-1949, 1238
  - Malaya
    - Dept Agric. Ann. Rep. 1949, 1244
    - Dept Agric. Padi trials 1949-50, Investigations 1950, 602, 719
    - Mechanization Quarterly Prog. Rep. July-Sept. 1950, 601
  - Mauritius. Sugar-cane Res. Sta. Ann. Rep. 1949, 604
  - Morocco. Agric. Res. Papers 2, 1949, 613
  - Northern Ireland, Rep. oat variety trials, 967
  - Northern Rhodesia
    - Dept Agric. 1948, 274
    - Dept Agric. Ann. Rep. 1949, 606
  - Nyasaland Protectorate, Dept Agric. Ann. Rep. 1948, 608
  - Puerto Rico, Fed. Expt Sta., Mayaguez 1949, 275
  - Queensland
    - Dept Agric. Stock Ann. Rep. 1948-9, 594
    - Dept Agric. Stock Ann. Rep. 1949-50, 595
  - Rhodesia Dept Agric. Ann. Rep. 1949, 607
  - Sarawak Dept Agric. Ann. Rep. 1949, 603
  - South America, Second Botanical Congress, 1948, 1254
  - South Australia, Waite Agric. Res. Inst. 1943-7, 596
  - Sweden, Swedish Seed Assoc. Ann. Rep. 1948, 614
  - Tanganyika Dept Agric. Ann. Rep. 1948, 920
  - Uganda Dept Agric. 1947-8, 609
  - USA
    - Colorado Agric. Expt Sta. 1948-9, 276
    - Florida Univ. Agric. Expt Sta. 1947, 1948 and 1949, 277
    - Georgia Expt Sta. 1949, 278
    - Illinois Univ. Agric. Expt Sta. Rep. 1947-8, 617
    - Illinois Univ. Agric. Expt Sta., Rep. 1948-50, 1234
    - Iowa State Coll. Agric. Expt Sta. 1949, 279
    - Kentucky Agric. Expt Sta. Ann. Rep. 1949, 618
    - Louisiana Agric. Expt Sta. Ann. Rep. 1948-9, 619
    - Maine, Agric. Expt Sta. 1949, 217, 280
    - Memphis Cotton Insect Conference 1951, 454
    - Mississippi Southern Weed Conference, 1235
    - Missouri Agric. Expt Sta. Ann. Rep. 1948-9, 620
    - Nebraska Univ. Agric. Expt Sta. 1949, 281
    - Nebraska Univ. Agric. Expt Sta. Ann. Rep. 1950, 621
    - New Hampshire Agric. Expt Sta. Ann Rep. 1949, 928
    - New York, Northeastern Weed Control Conference 1951, 1236
    - New York State Agric. Expt Sta. Ann. Rep. 1950, 929
    - North Dakota Agric. Expt Sta. Ann. Rep. 1949, 622
    - Ohio Agric. Expt Sta. Ann. Rep. 1949, 623
    - Oregon Agric Expt Sta. Ann. Rep. 1950, 624
    - Pennsylvania Agric. Expt Sta. 1949, 625
    - Purdue Univ. Agric. Expt Sta. 1949, 282
    - Purdue Univ. Agric. Expt Sta. Ann. Rep. 1950, 930
    - South Carolina Agric. Expt Sta. 1948, 283
    - Texas Agric. Expt Sta. Agric. Res. 1947-49, 1237
    - Virginia Agric. Expt Sta. Rep. 1947-49, 931
    - Virginia Agric. Expt Sta. Rep. 1950, 932
    - Wyoming Agric. Expt Sta. Ann. Rep. 1947-8, 626
    - Wyoming Agric. Expt Sta. Ann. Rep. 1948-9, 627
  - West Australia, Kimberley Res. Sta. Prog. Rep. 1947-9, 593
- Reproduction of maize, 360
- Research in agriculture, 564
- Research in the tropics, 565
- Residual effects of manure on cotton, 590
- Respiration
  - and ascorbic acid, 30

  daily fluctuation in sugar beet, 436
  groundnuts, 104
  of ripening grain, 239
  rape root and metabolism, 246
Respiratory poisons, 891
Rhizobium, 1061
R. leguminosarum, 931
Rhizoctonia solani, 147
Rhizopus nigricans, 787
Rhothane, 117
Rhynchosia acuminatifolia, 839
R. phaseoloides, 1122
Rhynchosporium scald, 980
R. secalis, 980
Rice, 85, 177, 221
  aerial fertilizing, 85
  after bare fallow, 719
  algae control, 379
  ammonium sulphate, 275
  and algaecide, 391
  and 2,4-D, 215, 1161
  artificial drying, 88
  as soil conservation crop, 180
  beetle, 173
  bird damage, 173, 1024
  blast, 382, 1244
  carotene content, 1189
  chemical composition, 571
  Cirphis unipuncta, 924
  copper sulphate, 391
  costs, 599
  cultivation, 173, 389
  depth of ploughing, 719
  double cropping 178, 370, 389, 598
  double ploughing, 266, 267
  double transplanting, 598
  dry cultivation, 719
  drying with radio frequency heat, 619
  dusting, 601
  Echinochloa colona, 1157
  ether vapour, 380
  evolution and species, 390
  fertilizers, 86, 87, 266, 610, 717, 719, 724, 725, 736, 920, 1027, 1237, 1240, 1244
  fertilizing from the air, 292
  flood resistance, 374
  floral abortion, 388
  foot rot, 597
  Fusarium spp., 381
  grain drying, 1237
  grain moisture content, 267
  green manuring, 717
  growing in sand culture, 84
  harvesting, 173
  Helminthosporium oryzae, 723
  Hispa spp., 384
  hot water treatment, 723
  in Africa, 721, 900
  in Australia, 173, 1020
  in California, 716
  in Ceylon, 1018, 1019
  in French Cameroons, 366
  in French Sudan, 188, 373, 717, 818
  in Gambia, 474
  in Guiana, 721
  in Hong Kong, 365
  in Italy (Modena), 371
  in Lombardy, 633
  in Malaya, 720
  in Morocco, 367, 368
  in Persia, 630
  in Philippines, 721
  in rotation with *Crotalaria retusa*, 188
  in rotation with wheat and oats, 173
  insect control, 386
  insecticides, 386
  insect pests, 1244
  in Trinidad, 611
  in USA, 721
  in USSR, 369
  in West Australia, 593
  irrigated
    and soil conservation, 202
    cultivation, 215
  irrigation, 73, 173, 367
  leaf hoppers, 1244
  line sowing, 598
  manganese and catalase activity, 525
  manurial trials, 598
  mechanized cultivation, 1244
  mechanized production, 266
  mixed cropping, 481
  morphology, 1025, 1026
  nematode disease, 387
  nitrogen, 717
  NPK, 367, 391, 604
  off-season cropping, 719
  off-season cultivation, 1244
  Ophiobolus miyabeanus, 380
  pest control, 385, 598, 612
  pests in Japan, 80
  photoperiodism, 389
  pH range, 392
  pre-soaked seed sown in water, 920
  production costs, Arkansas, 89
  rotations, 818
  rotten neck, 382
  seed disinfection, 381
  seed rate, 367, 718
  seed soaking, 719
  seed treatment, 377, 387, 598, 619, 723, 910, 1028, 1035, 1237
  Sesamia, 368
  small earth dams for irrigation, 372
  soil salts of water in virgin land, 923
  sowing, 1244
  sowing date, 387
  sowing from the air, 292
  sowing pre-germinated seed through water, 267
  spacing, 598
  sprouted seed, 718
  stalk borer, 1244
  stem borer, 385
  stem rot, 82
  summer ploughing, 598
  transpiration, 612
  transplanter, 601
  transplanting, 367, 719
  trials, 602
  uniformity trial, 90
  varietal differentiation of seed by staining, 722
  varietal differentiation when cooked, 726
  varieties, 269, 366, 370, 381, 594, 595, 597, 598, 610, 612, 721, 920, 1238
    Adt 4....375, 377
    Adt 9....375
    Afaa Mwanza....920
    American 1600....367
    Arborio....74
    Ardizzone....368
    Arkansas Fortune....75
    Arkrose....75
    Asatu....75
    Balila....367
    Bam 9....375
    Benibhog....377
    Benlloch....368
    Bentoubala....717
    Bersani....74
    Bluebonnet....75, 78, 1237
    Blue Rose....388
    Calady 40....77
    Caloro....75, 76, 77
    Caloro II....173
    Calrose....76, 77
    Carolino....388
    Cateto....376
    Century Patna....79
    Chacarero F.A.....1023
    China 45....375
    China 47....375
    Cnossbered....388
    Co. 2....377
    Cody....75
    Colusa....76, 77, 388
    Colusa 177....173
    Conway....76, 77
    Cristal....388
    D.52/37....266
    Dissi-N-14....717
    Dourado Aglilha....376
    Edit....388
    Elon Elon....374
    Fortuna....78, 1240
    FR 43 B....377
    GEB 24....377, 385
    Iguape....376
    Inintiw....392
    Jaguari....376
    Jowa....389
    Joya....90
    Kaawa palagad....86
    Kahogo....920
    Kamrose....75
    Lact Colony....388
    Lady Wright x Caloro....173
    Late Caloro....173
    Magnolia....78
    Maji 1/18....920
    MOI....718
    MO2....718
    Mtu. 5....375
    Muar Pa Dok....1244
    Muar Pergau....1244
    New Guinea...924
    Nira....75
    Onsen....76
    Orissa beali....375
    Pachchaiperumal 2462/11....102
    Perola....376
    Plr 2....375
    Pokkali....1021
    Prelude....75
    PTB 4....375
    Ramai....374
    Raminad Str. 3....374
    Razza 77....367
    Rexark....75
    Rexoro....78, 1237
    Rosantabahor....388
    Senatore Novelli....367
    Seraup Kechil....374
    Sikasso B....717
    Sikasso B....717
    Sikasso H....717
    Sornavari....368, 717
    Suduheenati ICPY-15....1022
    T.90....375
    T.412....377
    T.812....375, 598

    - T. 1145....375, 377
    - T. 1242....375, 598
    - Taiwan....1244
    - Texas Patna....78
    - Wagwag....374
    - Zenith....75, 78
    - 2/8....920
    - 2/9....920
    - 2/16....920
    - 54/42....266, 267
    - 85/42....266, 267
    - 95/42....266, 267
    - $\frac{1095/3}{6}$....375
    - $\frac{1095/3}{12}$....375
    - $\frac{1095/3}{15}$....375
  - water balance, 612
  - water hyacinth, 834
  - water planted, seed treatment for, 619
  - water requirement, 73
  - water treatment of growing crop, 267
  - water weevils, 383
  - weed control, 598, 619
  - weeds, 173, 215, 221, 717, 836, 1156, 1161, 1237
  - weevils, 83
  - wet cultivation, 601, 719
  - yield decrease due to weed invasion, 188
- *Ricinus communis*, 467—see also Castor
- Rigidity in plants, 1195
- Rock phosphate and cotton germination, 609
- Rodan, 321
- Root-bug of maize, 358
- Root crops and hormone herbicides, 223
- Root crops in Finland, 1068
- Root growth of oats in subsoil, 1194
- Root investigations, 547, 548
- Root knot nematodes, 281
- Root length variations, 881
- Rootone, and wheat germination, 28
- Root production, 247
- Root, relations with soil air, 238
- Root rôle, in photoperiodism, 540
- Root rot
  - of cotton, 145
  - of sugar beet, 621
  - of wheat, 730
- Root system of cotton, 1090
- Rotations, 265, 277, 279, 599, 606, 612, 920, 926, 930, 932, 1120, 1233
  - and fertilizers, 282, 479, 822, 922
  - and soil fertility, 927
  - and wheat yields, 622
  - cotton, 590, 818, 1070
  - cotton/green manure, 188
  - cotton/millet/fallow, 188
  - cotton/millet/groundnuts/fallow/millet/fallow, 177
  - cotton, three course, 153
  - dryland crops, 281, 621
  - four course, 596
  - in French Equatorial Africa, 821
  - in Germany, 815, 829
  - in Senegal, 825
  - in Victoria, 588
  - ley arable, 589
  - maize, 920
  - maize/oats/clover, 337
  - oats/maize, 490
  - rice, 818
  - rye/roots/oats/clover/grass, 479
  - sugar beet, 626
  - ten course, in Siberia, 293
  - under irrigation, 621
  - wheat, 626, 641, 664
- Rotten neck of rice, 382
- Row width
  - spacing and yields, 127
  - sugar beet, 125, 126
  - sugar beet, and sugar content, 127
- *Rubus fruticosus*, 591
- *Rudbeckia bicolor*, 540
- *Rumex*, 504, 1155
- Russian knapweed, 627
- Rust
  - beans, 627
  - cereals, 268, 731
  - flax, 923
  - oats, 278
- Rutin, 1232
- **Rye**
  - and BHC, 250, 562
  - and hormone herbicides, 224
  - ascorbic acid content, 672, 673
  - as green manure, 271
  - autumn sowing, 195
  - bluegrass billbug, 319
  - branching, 543
  - DDT and germination, 753
  - fertilizers, 976
  - garlic extract and germination, 864
  - in Argentina, 342
  - in Finland, 974
  - in North Africa, 473
  - magnesium deficiency, 94
  - mechanical counting of seed, 257
  - multi-flowered spikelets, 346
  - nitrogen and branching, 543
  - onion extract and germination, 864
  - pH, and ascorbic acid content, 672
  - pH of nutrient solutions, 862
  - root production, 247
  - seed treatment, 1036
  - sodium arsenate, 855
  - stem moth, 975
  - tetraploid varieties, 341
  - transplanting and branching, 543
  - varieties, 38, 974, 1247
    - Abruzzi....1222
    - Borris Perle....340
    - Centeno Pico....92
    - Centeno Region Pico....92
    - Forrajero Massaux....35
    - Haastrup....340
    - Kings....341
    - King II....93, 941
    - Maria....340
    - Petkus....340
    - Petusker....941
    - Pico....33, 35, 36
    - Rosen....1222
    - Sangaste....341
    - Sel. Local G.2....34
    - Sel. Manfredi 73....91
    - Sel. Manfredi 76....91
    - Steel....341, 941
    - Svalöf Kongs-rug....340
    - Svalöf Stål....340
    - Toiro....341
    - Trifolium....340
    - Wasa II....341
    - White Soviet....622
  - vernalization, 543
- Ryegrass, 845, 1160
- **Safflower**, 167, 281, 624, 923, 1099
  - fertilizers, 621
  - growth studies, 596
  - irrigation, 621
  - seed rate, 621
  - varieties, 596
  - volunteer barley and IPC, 845
  - wild oats and IPC, 845
- *Sagina maxima*, 841
- *Salicornea herbacea*, 857
- Salinization, cotton, 1088
- Salt and plant growth, 857
- Salt land in Australia, 326
- Salt on barley and sugar beet, 589
- *Salvia reflexa*, 591
- Sand culture methods for rice, 84
- Sand drifts and water usage, 591
- Santobrite, 220
- Sarawak Dept Agric. Ann. Rep. 1949, 603
- *Sarothamnus scoparius*, 803
- Saw palmetto, 1137
- Scabrin, 936
- Scale insect of cassava, 444
- *Schoenobius incertellus*, 80, 385, 1244
- *Sclerotinia* spp., 416
- *Sclerotium bataticola*, 999
- *S. oryzae*, 82
- *S. rolfsii*, 932
- *Scirpus mucronatus*, 1156
- Scotland, agriculture, 472
- Screening of herbicides, 1163
- *Secale cereale*—see Rye
- Seed(s)
  - analysis, 909
  - composition, 240
  - disinfection of rice, 381
  - distribution of fungicides, 255
  - dormancy of wild oats, 589
  - enzymes and germination, 282
  - fat production, 866
  - health, 909
  - inoculation of legumes, 419
  - inspection of cereals, 1032
  - in Sweden, 614
  - lupin, viability, 535
  - maize, viability, 36
  - marketing, 279
  - mechanical counting, 257
  - processing, sugar beet, 140
  - protection against aphids, 113
  - qualitative control in Britain, 934
  - regulations in Sweden, 574
  - separation of valuable constituents, 395
  - storage, 277
  - sugar beet, 140
  - viability, 36, 41, 241, 317, 535, 1209
  - water supply, 240
- Seed exchange
  - Belgium, 631
  - Portugal, 1253
- Seedling disease of cotton, 278
- Seedox, 932
- Seed production
  - beet, 756
  - hemp, 463
  - in Queensland, 998
  - minimum distances between related root crops in Sweden, 143
- Seed rate
  - barley, 932
  - beans, 589
  - *Crambe abyssinica*, 812

  green manures, 1122
  linseed, 595
  maize, 282, 617, 932
  oats, 932
  peas, 414, 596
  rice, 367, 718
  safflower, 621
  singletary pea, 410
  sorghum, 599
  soyabeans, 507
  sugar beet, 139, 141, 420
  wheat, 643
Seed treatment, 279, 317, 1219
  barley, 336, 671, 1034, 1036
  beans, 276, 626
  buckwheat, 966
  cereals, 394, 732, 1037, 1232
  cotton, 147, 278, 283, 599, 787, 1082
  flax, 622
  groundnuts, 612, 931, 932, 1048, 1049
  hot water treatment, 617
  in Brazil and Paraguay, 910
  linseed, 1098
  maize, 281, 612, 655, 696, 1035
  nitragin inoculation of peas, 412
  oats, 256, 335, 336, 671, 1034, 1035, 1036
  peas, 109
  rice, 377, 387, 598, 619, 719, 723, 1028, 1035, 1237
  rye, 1036
  sorghum, 1035
  soyabeans, 256, 282, 746, 1045
  sugar beet, 426
  sunflower, 766
  wheat, 20, 335, 617, 655, 656, 671, 863, 922, 1034, 1035, 1036, 1200
Selective herbicides, 216
Selective weed control, 222
Selenium, 853
Semesan Jr., 910, 983
Semillón, 1175
Semi-looper caterpillar on cotton, 599
Senegal
  conservation, 825
  land and water management, 817
  mechanical cultivation of groundnuts, 409
Sensitivity of wheat to light, 539
Separation of valuable seed, 395
Seradella, 1124
Serial correlation in yield experiments, 1227
Serrenoa repens, 1137
Sesame, 281, 283, 900
  after fire clearance, 190
  and maize, 608
  in El Salvador, 1095
  in Persia, 630
  pest control, 612
  sowing date, 1095, 1240
  spacing, 1095, 1240
  pests and diseases, 408
  planting date, 608
  varieties
    Caribe,...1240
    China White, No. 1....1240
    China Yellow....1240
    Criolla....1240
    Indian White No. 2....1240
    Local....1240
    Venezuela 51....1095, 1096, 1240
    Venezuela 52....1095, 1096, 1240
  wilt, 283
Sesamia, 368
S. inferens, 385
Sesamum indicum—see Sesame
S. orientale—see Sesame
Sesbania, 599
Setaria italica, 481
  identification, 711
  irrigation, 178
  sowing date, 178
  varieties
    Common....712
    German....712
Shell oil, 1145
Shell oil, 170, 1146
Shell copper fungicide, 1244
Sheller (legumes), 107
Shelter belts, 492
Shifting cultivation
  in Ceylon, 1114, 1115
  in Gambia, 474
Shoot development in *Vicia faba*, 1059
Siberia
  wheat, 945
  winter wheat, 297
Sida sp., 1085
Silene, 504
Silver beet, 326
Sinapis, 812
S. alba, 514—see also White Mustard
S. arvensis, 214, 501, 1162
Single germ sugar beet seed in Italy, 122
Single oil, 117
Singletary pea—see *Lathyrus hirsutus*
Sinox, 220
Sinox G, 1145
Sinox W, 217, 1145
Sitophylus cryzus, 58
Sitotroga cerealella, 1003, 1011
S. cerealis, 59
6-amino-undecane on wheat seedlings, 558
Skeleton weed, 591
Small grain(s)
  and 2,4-D, 623
  improvement, 281
Smog in South California, 576
Smut
  of barley, 276
  of oats, 335
  of wheat, 321, 335
Sodium
  as plant nutrient, 529
  determination in plants, 1212
  on *Phaseolus aureus*, 1058
  on *Ph. vulgaris*, 1058
Sodium arsenate, 836
  on barley, 855
  on rye, 855
Sodium chlorate, 604, 836, 1134
Sodium diethyl dithio carbamate, 233
Sodium 2,4-dichlorophenoxyethyl sulphate, 513
Sod webworms, 281
Sogata furcifera, 80, 1244
Soil acidity and sugar beet, 437
Soil air in relation to roots, 238
Soil and sugar beet yield, 624
Soil blowing in Holland, 1124
Soil conservation, 199, 489, 1240
  and cover crops, 279
  in the Belgian Congo, 203
  in E. Africa, 202
  in French Sudan, 177
  in Illinois, 827
  in Nebraska, 490, 621
  in Tanganyika, 180, 493
  in Venezuela, 262
  strip farming, 1233
  use of irrigated rice, 180
Soil degradation and mechanical cultivation, 487
Soil erosion
  control, 492
  in Germany, 829
Soil exhausting crops, 202
Soil fertility
  and cotton, 456
  and legumes, 1121
  in S. Australia, 588
  in Victoria, 588
Soil fumigation, 432
Soil influence on sugar in sugar beet, 133
Soil micro-organisms
  and herbicides, 1171
  and maize growth, 621
Soil-moisture conservation, 182
Soil regenerative crops, 202
Soil relationship with sugar beet yield, 422
Soil salinity, 857
Soil status and maize yield, 349
Soil temperature and barley and oat development, 1193
Solanum spp., 1147
S. auriculatum, 604
S. indicum, 604
Somalia, cotton insects, 148
Somerset, mineral deficiencies, 471
Sonchus arvensis, 214, 501
Sophora angustifolia, 839
Sorghum, 54, 202, 780, 1246
  African origin, 900
  after fire clearance, 190
  after tobacco, 608
  and BHC, 250
  as barrier to natural crossing in cotton, 794
  bird damage, 72
  charcoal rot, 1017
  chemical composition, 571
  costs in mixed cropping, 599
  disease resistance, 71
  fall armyworm control, 63
  fertilizers, 599
  grain drying, 1237
  improvement, 281
  in Arkansas, 715
  in El Salvador, 1014
  in France, 1015
  in French West Africa, 362
  in Nigeria, 636
  in Orange Free State, 182
  in Sudan, 72
  in West Australia, 593
  irrigation, 178
  phytotoxicity induced by insecticides, 63
  scheme in Australia, 286
  seed rate, 599
  seed treatment, 910, 1035
  spacing, 1014
  Sphacelotheca sorghi, 71
  stalk rot, 1017
  storage, 1237
  tie ridging, 590
  2,4-D, 364, 621
  varieties, 72, 283, 469, 594, 595, 612, 920, 1016
    Aklamoi White....72

    Arizona Hegari....1014
    Bonita....604
    Caprock....593
    Coes....364
    Combine Kafir-60....1237
    Double Dwarf Sooner....604
    Double Dwarf Milo....70
    Double Dwarf Yellow Sooner Milo 70
    Dwarf White Milo....72
    Early Hegari....278, 1015
    Early White Milo....70
    Extra Early Sumac....1017
    Feterita (F.C. 811)....72, 1017
    Grohoma....1014
    Hegari....278, 593, 1014
    IPI 13....599
    Kafir....1017
    Kafir-Milo....363
    Kalo....286, 593, 1014
    Martin....364
    Martin's Combine Milo....278
    Midland....364, 604
    Plainsman....604
    Plainsman Combine Milo....278
    Redbine-60....1237
    Redbine-66....1237
    S.40....1015
    S. vulgare × *S. coriaceum*, 274
    Shallu....1014
    Shallu Agros 2650....1240
    Texas Blackhull....1017
    Turkey No. 19....604
    Wheatland....286, 593
  witchweed, 920
Sorghum halepense, 1133, 1134, 1142, 1147, 1161, 1237
  loose kernel smut, 363
S. nitidum, 1016
S. purpureosericeum, 190, 1016
S. saccharatum
  in Italy, 714
  var. Sugar....714
S. versicolor, 1016
Sorgo, 363
South Africa
  climate at Towoomba, 1112
  irrigation, 1118
  sunflower, 164
South America
  analogous climates in Australia, 263
  early agriculture, 1174
  plant collecting expedition, 263
South Australia
  soil fertility, 588
  Waite Agric. Res. Inst. Rep. 1943-7, 596
  wheat, 588, 592
Southern armyworm, 63
Southern corn root worm on groundnuts, 932
Southern hemisphere, flora and useful plants, 846
Southern maize root worm, 931
Southern Rhodesia
  agricultural bibliography, 902
  diseases, 575
  irrigation, 826
Southern wilt of groundnuts, 932
Sovacide, 836
Sowing
  cotton, 1069
  rice, 1244
Sowing date
  and cereal disease resistance, 18
  and soyabean characters, 404
  chick pea, 922
  cotton, 178, 590, 594, 600, 1076
  flax, 624
  groundnut, 178
  Hibiscus cannabinus, 269
  Jute, 464
  linseed, 595, 1097
  maize, 278, 983, 984
  oats, 40
  oil crops, 195
  peas, 596, 414
  rape, 1105
  rice, 387
  rye, 195
  sesame, 1095, 1240
  Setaria italica, 178
  singletary peas, 410
  soyabeans, 597, 1240
  sugar beet, 128, 138, 762
  turnip-rape, 811
  Vicia spp., 112
  wheat, 5, 7, 9, 10, 12, 13, 195, 296, 297, 299, 308, 599, 641, 643
Sowing depth, wheat, 643
Sowing methods, flax, 592
Sowing pre-germinated rice seed through water, 267
Sowing pre-soaked rice seed in water, 920
Sowing sugar beet in "earth-pots," 760, 1121
Soyabeans
  Agromyza control, 99
  ammonium nitrate, 405
  and BHC, 250
  and ferrous sulphate, 100
  and minerals, 100
  and nitrogen, 617, 1234
  and 2,4-D, 1158
  ascorbic acid, 1047
  autoclaving, 281
  beans, 399
  bordered by maize, 1234
  brown stem rot, 1232
  chemical composition, 571
  chlorosis, 100
  diseases in Illinois, 745
  fertilizer trials, 279
  grading, 572
  harvesting date, 1042
  hay, 399
  hot water treatment, 746
  in Australian Sorghum Scheme, 286
  in Belgium, 402
  in Illinois, 743
  in Israel, 1042
  in Italy, 400, 1043
  in Nigeria, 636
  in Persia, 630
  in rotation in French Equatorial Africa, 821
  in Sweden, 97, 744
  intercropped, 1041
  intercropping, with tung, 608
  interplanted with maize, 932
  magnesium and N fixation, 1046
  mechanical cultivation, 507
  manganese, 849
  manganese nutrition, 1047
  niacin, 734
  nitrogen, 617, 1234
  nodulation, 401, 1045, 1096
  nutritive value of seeds, 281
  oxygen supply to plant roots, 553
  pantothenic acid, 734
  pests, 747
  pH, 1158
  phosphorus deficiency, 527
  purple stain, 746
  reductase in sprouts, 533
  root oxygen supply, 553
  seed inoculation, 1044
  seed rate, 507
  seed treatment, 256, 282, 1045
  sowing date, 597, 1240
    and seed compositional characters 404
  spacing, 507, 1042
  trials, 602
  trypsin inhibitor, removal of, 281
  varieties, 97, 279, 281, 283, 400, 402, 570, 595, 601, 612, 618, 734, 744, 932, 1238, 1244
    Acadian....278
    Biloxi....553
    Blackhawk....930
    Boone....404
    Chief....625, 742
    China....1042
    C-N-S....278
    Dunfield....404, 742, 1042
    Dunfield x Illini....98
    Earlyana....98, 256, 930
    Early Minnesota Manchu....98
    Fiskeby III....744
    Gatan....278
    Gibson....742
    Habaro....98
    Haberland Creole....1042
    Illini....404, 742
    Irvines' Selection....742
    Jaune Grain....1042
    Late Pennsoy....625
    Lincoln....98, 256, 625, 742
    Lincoln × (Lincoln × Richland) 1044
    Louisiana 41-1219....403, 619
    Macoupin....1042
    Manchu (Montreal strain)....622
    Manchu III....527
    Mandarin....404, 930
    Mandell....404
    Missoy....1042
    Mukden....404
    Nanda....1240
    Ogden....278
    Ototoan....1240
    Ottawa Mandarin....98
    Palmetto....1042
    Patoku....625, 742
    Pennsoy....625
    Potch....742
    Richland....404
    Roanoke....278
    Scioto....742
    Viking....625
    White Biloxi....1042
    Wood's Yellow....1042
  weed control, 507
  weeds, 1133
  wild oats and IPC, 845
  yields, 206, 507
Spacing
  and sugar beet yields, 124
  chickpea, 922
  cotton, 590, 594, 599, 600, 1074, 1240
  cotton and seed quality, 448
  groundnuts, 278, 1244
  Hibiscus cannabinus, 269

  linseed, 604
  maize, 53, 594, 707, 983, 985, 986, 1234
  maize (irrigated), 281
  peas, 414
  rice, 598
  sesame, 1095, 1240
  sorghum, 1014
  soyabean, 507, 1042
  sugar beet, 123, 125, 126, 139, 271, 420, 1062
  yam, 1067
Spain
  maize, 989
  sugar beet (irrigated), 759
Spanish botanical terminology, 1175
Sparteine sulphate and wheat respiration, 657
Specific heat of wheat, 1224
Spectrochemical determination of K content, 1211
Spergon, 109, 256, 377, 910, 931, 932, 1045, 1237
Spergon, DDT, 932
Spergon-SL-DDT, 1035
Spergula arvensis, 835
Spersul, 1244
Sphacelotheca holci, 363
S. sorghi, 71
Sphaerella linorum, 162, 1098
Spiny bollworm of cotton, 452
Sporobolus aeroides, 865
S. virginicus, 326
Spot blotch of barley, 622
Spotted spider mites, 792
Spraying from aircraft, 622
Spurry, 835
Stacking barley, 676
Stainers of cotton, 452
Staining rice seed to distinguish varieties, 722
Stains, 722
Stalk borer of maize, 920
Stalk borer of rice, 1244
Stalk rot of maize, 932
Stalk rot of sorghum, 1017
Starch content of wheat, and light, 25
Starch content of groundnut seed, 407
Stellaria media, 214, 228, 837
Stem borer of rice, 385
Stem-break and browning of flax, 1094
Stem moth, 975
Stem rot of beans, 416
Stem rust of oats, 39
Stem rust of wheat, 1255
Stem weevil of cotton, 145
Sterculiaceae, 378
Stipa disease of barley, 622
Stirpan, 216
Stizolobium deeringianum, 983, 1122
Stokroos—see *Hibiscus* spp.
Stooking barley, 676
Storage
  cereals, 396
  cotton seed, 1040, 1237
  grain, 573, 584, 1040
  maize, 279
    in the husk, 59
    longevity of seed, 282
    seed, 58
  seed, 277
  seed and fungicide treatment, 336
  sorghum, 1237
  technique, 1039
Strangles of sugar beet, 428, 628
Streptomyces, 1220
Striga sp., 920
S. densiflora, 1016
S. hermonthica, 72
S. germination, 1139
S. lutea, 1016
Strip cropping, 599
Stubble burning, 208
Stubble mulch cultivation, 281
Stubble mulch farming, 301
Stubble sowing wheat, 293, 297
Stylosanthes, 263
Suaeda prostrata, 857
Subsoil, as root environment, 1194
Subsoiling, 484
Sudan
  cotton, 1071
  cotton rotations (three course), 153
  fire clearance, 190
  sorghum, 72
Sudan grass, 363
  in Orange Free State, 182
Sugar in groundnut seed, 407
Sugar beet, 621, 764, 1247
  and ammonium nitrate and phosphate, 627
  and bis dimethylamine phosphonous anhydride, 130
  and boron, 773
  and growth substances, 1200
  aphids, 430
  barley as cover crop, 429
  beet flea, 769
  beet leaf bug in Saxony, 770
  black root, 628, 1232
  breeding, 327
  by-products, 758
  calculation of yields, 774
  carbohydrate content of leaves, 1065
  carbonic anhydrase content, 237
  Chaetocnema tibialis, 767
  cross blocking, 141
  cross thinning, 141
  cultivations, 281
  Cuscuta pentagona, 767
  damping off, 621
  deep ploughing and germination, 824
  disease resistance, 279
  diseases and pests, 271, 281
  doubles, and yield, 124
  enemies, 427
  fertilizer(s), 50, 271, 281, 757, 773
    and sugar content, 133
    placement, 276, 480, 589
  flea beetle, 433
  germination inhibitor from, 131
  granulated fertilizers, 134
  green manure, 423
  growing irrigated in USA, 758
  harvesting, 440
  heteroauxin treatment of seed, 426
  high protein pellets from tops, 629
  in Italy, 120, 761, 766
  in Persia, 630
  in Scotland, 472
  in Spain, 759
  irrigation, 121, 281, 423, 589, 759
  linseed as cover crop, 429
  liquid fertilizers, 135
  maleic hydrazide, 772
  manganese deficiency, 438
  manuring, 423
  mechanical weeder, 276
  mechanization, 281
  mechanization of harvesting, 271
  mineral deficiencies, 471
  mosaic, 1065
    transmission in seed, 431
  nematodes, 423, 432
  nitrogen, 439, 589
  phasic development, 132
  photosynthesis, 436
  planting, 121, 281
  pocket sowing, 763
  potash, 589
  precision drilling, 139, 140, 271
  press wheel, 136
  rainfall and impurities, 771
  relationship of soil and yield, 422
  respiration, 436
  root rot, 621
  rotations, 626
  row width, 125
    and sugar content, 126
  rye grass and IPC, 845
  salt, 589
  seed, 140, 1233
  seed and cell size relation to precision drilling, 137
  seedling emergence, 138
  seed processing, 140
  seed rates, 141, 420
    with precision drilling, 139
  seed treatment, 426
  single germ seed in Italy, 122
  singling, 271
  soil acidity effects, 437
  soil and sugar content, 133
  soil and yields, 624
  sowing, 138
  sowing dates, 128, 762
  sowing depth, 138
  sowing in 'earth-pots', 760
  spacing, 123, 125, 139, 271, 420, 1062
    and sugar content, 126
    and yield, 124
  stand, 271
  strangles, 428, 628
  sugar content, 133, 771
    and row width, 126, 127
    and spacing, 126
  sugar production, 132
  sugar, water and dry matter relationships, 132
  Tanymecus palliatus, 1063
  thinning, 141
  topping, 271, 421
  translocation, 1065
  uptake of sugar nutrients by leaves, 589
  varieties, 271, 424, 765, 905
    Cambier P....1062
    Cesena N....1062
    Indian No. 41....431
    Klein Wanzleben....129
    Mezzano Z....1062
    Milka....425
    Nora....425
    Regia....425
    Särimner III....425
    Solid....425
    Svea Rex....425
  variety testing, 765
  virus yellows, 430, 431, 1064, 1065
  weed control, 271
  wireworms, 435
  yellows, 271, 429, 768
  yields, 271, 280
  yields and root length, 881
Sugar cane in Persia, 630

- Sugar cane interplanted with food crops, 604
- Sulphate of ammonia on cotton, 590
- Sulphur, 146, 622, 932, 1085
  - and nitrogen metabolism, 852
  - as radioactive tracer in fertilizers, 982
  - control of *Cercospora* spp. on groundnuts, 103
  - dusting, and oil in groundnuts, 106
  - dusts, 792
  - in soil and crop production, 854
  - on groundnuts, 105
- Sulphur dioxide, 1084
- Sulphuric acid, 222, 499
  - sprays on wheat, 23
  - treatment, 1082
- Summer ploughing of rice, 598
- **Sunflower**, 281, 923
  - and growth substances, 882
  - ascidium formation, 1102
  - carbohydrate formation, 531
  - cold treatment of seed, 766
  - evolution, 1103
  - fertilizers, 1104
  - floral anomaly, 1101
  - in Australian Sorghum Scheme, 286
  - in Italy, 766
  - in Orange Free State, 182
  - in South Africa, 164
  - intercropped with potato, 687
  - maleic hydrazide, 888
  - pests, 281
  - protein formation, 531
  - seed viability test, 241
  - trials, 280
  - varieties, 17, 594, 595, 920, 1247
    - Giant of Odessa....766
    - Jupiter....164, 607
    - Manchurian Giant....1238
    - Mars....164, 607
    - Pole Star....164, 607
    - Russian....882
    - Saratov, selec. Pergamino....1101
    - Southern Cross....164, 607
  - virus, 1100
- Sunn-Hemp—see *Crotalaria juncea*
- Superphosphate
  - on bulrush millet, 590
  - on cotton, 590
  - on wheat, 622
- Supersinox, 216
- Survey of marginal land in Wales, 589
- Swaziland, bibliography, 903
- Sweden
  - minimum distance between related root crops in seed production, 143
  - rape, 165
  - Seed Assoc. Ann. Rep. 1948, 614
  - seed regulations, 574
  - soyabeans, 97, 744
- **Swedes,**
  - brown-heart, 441, 1233
  - club-root, 142, 927
  - fertilizer placement, 480
  - in Scotland, 472
  - varieties
    - Acadia....926
    - Bangholm....142, 927
    - Ditmars....927
    - Grønhovedet....142
    - Lamentian....926, 927
    - Rekord....142
    - Wilhelmsburger....142, 927
- Swede turnips,
  - varieties
    - Bangholm Gokstad....1066
    - Bangholm Hunsballe Vidarhov I. 1066
    - Bangholm Olsgaard....1066
    - Bangholm Øtofte X....1066
- Swedish fly, 1038
- Sweet clover in rotation, 622
- Syagrus beetle of cotton, 452
- Symbiosis of *Vicia faba* and *Bacterium radicola*, 119
- *Synedrella nodiflora*, 215
- Synthesis of fatty acids in vegetable seed, 866
- Synthetic hormones in weed control, 215
- *Syringopais temperatella*, 269, 509
- Tachnid fly, 599
- *Tagetes minuta*, 1151
- Take-all, 21, 22, 23
  - of wheat, 591, 596
- Talc powder, 385
- Tanganyika
  - Dept Agric. Ann. Rep. 1948, 920
  - land management, 172
  - mound cultivation, 482
  - soil conservation, 180, 493
  - wheat, 642
- Tannin in cotton attacked by wilt, 532
- *Tanymecus palliatus*, 1063
- *Tarache notabilis*, 1086
- Taxonomy of *Brassica* spp., 847
- TCA, 356, 623, 625, 836, 928, 1127, 1134, 1135, 1137, 1138, 1157, 1160, 1165
  - movement in soil, 886
- TDE, 64
- Teasel
  - cultivation, 1109
  - growing, 814
- Teaweed, 1147
- Technical BHC, 1222
- Technique of root investigations, 548
- Teff in Orange Free State, 182
- Tellurium, 853
- Temperature(s)
  - and jute growth, 464
  - and nutrient uptake, 588
  - and wheat, 294
  - in the USA, 184
- *Tephrosia*, 590
- TEPP, 627, 796, 1244
- Tetramethyl pyrophosphate, 933
- Tetramethyl thiuram disulphide, 1232
- *Tetranychus* spp., 747, 1085
- *T. atlanticus*, 792
- *T. bimaculatus*, 792
- *T. pacificus*, 792
- *T. telarius*, 452
- *Thielaviopsis basicola*, 147
- Thinning of sugar beet, 141
- Thiophosphate ester, 768,
- Thistle, 509
- 3-indoleacetic acid, 660
- 3-6-endoxo-hydrophthalates, 1166
- Thrips, 42, 1083
  - of cotton, 454
- *Thrips tabaci*, 1100
- *Thyreion gelotopoeon*, 1002
- Tibetan Uplands, barley, 681
- Tie-ridging, 590
- Tiliaceae, 378
- Tillage and plant growth, 588
  - and rice soils, 73
  - of wheat, 300
- *Tilletia* spp., 656
- *T. caries*, 320
- *T. foetida*, 320
- *T. tritici*, 952
- 'Tissue test' estimation of mineral deficiencies, 471
- *Tithonia diversifolia*, 604
- TMTD, 377, 628
- Toad flax, 1140
- Tobacco in Nigeria, 636
- Topping cotton, 1074, 1076
- Topping sugar beet, 421
- Toxaphene, 63, 64, 99, 117, 140, 1085, 1222, 1237
- Toxicity of herbicides, 228
- Trace elements
  - and chile saltpetre, 848
  - and cotton, 600
- Trailing saltbush, 326
- Translocation in sugar beet, 1065
- Translocation of radio-active 2,4-D1 by beans, 118
- Translocation of 2,4-D, 885
  - in *Vicia faba*, 1057
- Transpiration and growth substances, 890
- Transpiration of rice, 612
- Transplanting and branching of rye, 543
- Transplanting rice, 367, 719
- Treatment of land after rice, 920
- *Trialeurodes vaporiorum*, 1100
- *Tribulus terrestris*, 604
- *Trichogramma japonicum*, 80
- *Trifolium alexandrinum* as green manure, 1070
- Trinidad, rice production, 611
- Triple superphosphate
  - on barley, 627
  - on cotton, 590
- Tripod drying of barley, 676
- *Triticum* spp.—see Wheat
- Triton X-100, 1237
- Trypsin inhibitor in soyabean seed, 281
- Tubers, root production, 247
- 'Tuer,' varieties, 599
- Tufor, 378
- Turkey, cotton, 782
- **Turnips,** 191
  - as green manure, 271
  - altitude and behaviour, 323
  - brown heart, 441
  - environment and development, 323
  - in Scotland, 472
  - varieties, 1247
    - Goldi....775
    - Jobe....775
    - Long White Redhead....775
    - Lucratief....775
    - Milan....323
    - Oddi....775
    - Round White Redhead....775
    - Tokinashi-Kokabu....442
    - Voorrang....775
  - vernalization, 442, 775
- Turnip-rape
  - for oil, 811
  - in Finland, 811
  - sowing date, 811
- 2,3,5-T, 1186
- 2,3-tri-iodobenzoic acid and flax root growth, 552
- 2,3,5-triphenyl tetrazolium chloride, 41, 56, 241
- 2,3,6-trichlorobenzaldehyde, 1204
- 2,3,6-trichlorobenzoic acid, 1204

2,4-D, 40, 66, 85, 213, 215, 216, 217, 218, 219, 220, 222, 226, 227, 276, 355, 364, 378, 496, 497, 498, 501, 505, 507, 509, 515, 621, 623, 625, 795, 835, 836, 837, 838, 843, 889, 890, 1126, 1128, 1135, 1150, 1152, 1154, 1155, 1156, 1162, 1163, 1165, 1169, 1172, 1207, 1232, 1237, 1246
  absorption and translocation, 885
  and barley, 627, 1159
  and cereals, 502
  and drought resistance in wheat, 557
  and flax, 559
  and flax root growth, 552
  and kidney bean metabolism, 884
  and oats, 844, 506, 1161
  and oil content of linseed, 807
  and *Phaseolus aureus*, 1058
  and *Ph. vulgaris*, 1058
  and rice, 1161
  and soyabeans, 1158
  and wheat, 506, 557, 559, 844
  movement in soil, 886
  penetration into seeds, 842
  persistence in soil, 1170
2,4-dichlorophenoxyethyl, 1163, 1166
2,4-dinitro-6-secondary-butyl-phenol, 1149
2,4,5-T, 496, 497, 505, 883, 1127, 1137, 1237
Typha muelleri, 173
T. angustifolius var. *brownii*, 173
Tyrosine, 654
U 46, 462, 1162
Uganda
  Dept Agric. Rep. 1947-8, 609
  Namulonge Cott. Res. Sta., 291
Ultra-violet rays and vitamin C formation, 534
Union of South Africa, agriculture, 819
Uptake of nutrients by sugar beet leaves, 589
Uranium and plant development, 1187
Urena lobata, 924
  decortication, 609
  seed, 609
  varieties, 612
Urtica dioica, 212
U. urens, 212
Uruguay
  agricultural statistics, 904
  hybrid maize, 991
  plants, 1177
  Vicia spp., 112
  wheat, 948
USA
  cavitomic cotton, 793
  irrigation, 826, 1231
  millet, 712
  rainfall distribution (seasonal), 184
  rice, 721
  temperatures, 189
  2,4-D, 227
  Arkansas
    rice production, 89
    rice varieties, 75
    sorghum, 715
  California
    Earhart Plant Lab., 243
    Smog., 576
    rice, 716
    rice varieties, 76, 77
  Illinois
    maize, 693, 694
    oat varieties, 666
    soil conservation, 827
    soyabeans, 743
    Univ. Agric. Expt Sta. Ann. Rep. 1947-8, 617
    Univ. Agric. Expt Sta. Ann. Rep. 1948-50, 1234
    wheat varieties, 648
  Indiana, Purdue Univ. Agric. Expt Sta. Ann. Rep. 1950, 930
  Kansas, wheat, 1119
  Kentucky, Agric. Expt Sta. Ann. Rep. 1948, 618
  Louisiana
    Agric. Expt Sta. Ann. Rep. 1948-9, 619
    rice varieties, 78
  Mississippi, Southern Weed Conference, 1235
  Missouri, Agric. Expt Sta. Ann. Rep. 1948-9, 620
  Nebraska
    farming systems, 1117
    land resources and conservation, 828
    soil conservation, 490
    Univ. Agric. Expt Sta., Ann. Rep. 1950, 621
  New England, conservation farming, 205
  New Hampshire, Agric. Expt Sta. Ann. Rep. 1949, 928
  New York, Northeastern Weed Control Conference 1951, 1236
  New York State, Agric. Expt Sta. Ann. Rep. 1950, 884, 929
  North Dakota, Agric. Expt Sta. Ann. Rep. 1949, 622
  Ohio, Agric. Expt Sta. Ann. Rep. 1949, 623
  Oklahoma, cotton, 447
  Oregon
    Agric. Expt Sta. Ann. Rep. 1950, 624
    Umatilla irrigation project, 52
  Pennsylvania, Agric. Expt Sta. Ann. Rep. 1949, 625
  South Dakota, maize, 695
  Texas, Agric. Expt Sta. Agric. Res. 1947-49, 1237
  Virginia
    Agric. Expt Sta. Rep. 1947-49, 931
    Agric. Expt Sta. Rep. 1950, 932
  Wyoming
    Agric. Expt Sta. Ann. Rep. 1947-8, 626
    Agric. Expt Sta. Ann. Rep. 1948-9, 627
USSR
  collective farms, 1256
  rice, 369
  wheat in Baškii, 645
Ustilago spp., 336, 397
U. kolleri, 671
U. tritici, 20, 318, 321, 617, 643
Utricularia flexuosa, 836
Vancide 51, 1045
Varietal characters of maize, 350
Varieties, 991, 1013
  Abutilon, 465
  autumn sown crops, 195
  barley, 3, 17, 33, 34, 35, 36, 37, 38, 45, 46, 47, 48, 49, 218, 268, 283, 326, 343, 344, 469, 570, 596, 618, 622, 627, 677, 678, 679, 680, 918, 926, 927, 933, 949, 969, 977, 978, 979, 980, 981, 982, 1030, 1232, 1237, 1247
  beans, 108, 589, 609, 612, 887, 1232, 1240
  beans (snap), 1166
  buckwheat, 329, 965
  Camelina sativa, 468
  carrot, 926
  cassava, 612, 920, 1244
  castor, 467
  cereals, 95, 393, 905, 918, 932, 1031, 1233
  chickpea, 599
  cotton, 145, 149, 278, 450, 451, 469, 590, 593, 594, 595, 599, 600, 612, 619, 776, 777, 780, 782, 784, 785, 790, 797, 920, 921, 1056, 1071, 1076, 1077, 1078, 1079, 1081, 1083, 1087, 1089, 1091, 1116, 1240
  cowpea, 593
  Cyamopsis psoraloides, 110, 713
  Eleusine coracana, 110, 713
  field crops, 569
  flax, 17, 154, 155, 242, 622, 624, 798, 808, 920, 923, 926, 1232, 1233, 1247,
  groundnut, 102, 278, 407, 570, 593, 599, 607, 609, 612, 751, 932, 1237, 1238
  hemp, 463, 1247
  Job's tears, 612
  jute, 464
  Lathyrus ochrus, 923
  legumes, 920
  linseed, 162, 594, 595, 596, 599, 604, 807, 920, 1097, 1237, 1238
  maize, 17, 52, 55, 59, 226, 269, 278, 279, 280, 283, 352, 353, 354, 357, 469, 570, 594, 606, 612, 618, 623, 627, 686, 687, 691, 701, 707, 734, 867, 928, 983, 984, 985, 986, 987, 988, 989, 990, 992, 993, 994, 996, 997, 999, 1003, 1009, 1011, 1234, 1237, 1238, 1240, 1244, 1247
  mangolds, 926, 927
  millet, 920
  oats, 3, 17, 32, 33, 34, 35, 36, 37, 38, 39, 43, 45, 48, 218, 226, 256, 268, 278, 279, 282, 283, 326, 331, 333, 334, 338, 469, 505, 570, 594, 595, 596, 618, 622, 625, 627, 665, 666, 667, 668, 669, 734, 849, 883, 918, 923, 926, 927, 930, 941, 949, 967, 968, 970, 971, 972, 1030, 1237, 1247, 1248
  Paspalum scrobiculatum, 110, 713
  peas, 108, 268, 278, 412, 414, 596
  Phaseolus, 111
  Ph. aconitifolius, 110, 713
  Ph. angularis, 612
  Ph. aureus, 244
  Ph. radiatus, 1056
  Ph. vulgaris, 754
  pigeon pea, 110
  poppy, 1247
  poppy (opium), 166
  rape, 165, 809, 1105
  rice, 74, 75, 76, 77, 78, 79, 86, 90, 173, 266, 267, 269, 366, 367, 368, 370, 374, 375, 376, 377, 381, 385, 388, 389, 392, 594, 595, 597, 598, 610, 612, 718, 721, 920, 924, 1021,

  - 1023, 1028, 1237, 1238, 1240, 1244
  - rye, 33, 34, 35, 36, 38, 91, 92, 93, 340, 622, 941, 974, 1222, 1247
  - rye (tetraploid), 341
  - safflower, 596
  - sesame, 1095, 1096, 1240
  - sorghum, 70, 72, 278, 279, 281, 283, 286, 364, 469, 593, 594, 595, 599, 604, 612, 920, 1014, 1015, 1016, 1017, 1237, 1240
  - *Sorghum saccharatum*, 714
  - soyabeans, 97, 98, 274, 278, 283, 400, 402, 403, 404, 527, 553, 570, 595, 607, 612, 618, 619, 622, 625, 734, 742, 744, 930, 932, 1042, 1044, 1238, 1240, 1244
  - sugar beet, 129, 271, 424, 425, 431, 905, 1062
  - sunflower, 17, 164, 594, 595, 607, 766, 882, 920, 1101, 1238, 1247
  - swedes, 926, 927
  - swede turnips, 1066
  - tuer, 599
  - turnip, 323, 442, 775, 1247
  - *Urena lobata*, 612
  - velvet beans, 594
  - *Vicia* spp., 112
  - *Voandzeia subterranea*, 612
  - wheat, 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 16, 17, 24, 27, 30, 45, 48, 242, 268, 269, 274, 278, 279, 282, 283, 294, 295, 296, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 323, 325, 326, 335, 469, 505, 542, 557, 570, 594, 595, 596, 599, 605, 606, 612, 618, 622, 625, 627, 640, 641, 643, 644, 647, 648, 649, 650, 651, 652, 653, 656, 658, 662, 734, 857, 878, 883, 918, 920, 922, 926, 927, 930, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 954, 955, 956, 958, 964, 1191, 1200, 1232, 1234, 1237, 1246, 1247, 1248
  - wheat (three month), 15
  - yam, 612, 1067
- Varsol B, 1145
- Vegetal embryos, viability, 241
- Vegetative growth of maize, 701
- Velvet bean caterpillar, 747
- Velvet beans, 96, 220
  - as green manure, 607
  - intercropped with tung, 608
  - varieties, 594
- Venezuela
  - agricultural ecology, 261
  - soil conservation, 262
  - *Sphacelotheca sorghi*, 71
- Vernalization
  - beans, 797
  - cotton, 797
  - maize, 68
  - *Phaseolus aureus*, 244
  - rye, 543
  - turnips, 442, 775
  - wheat, 29, 542, 661, 662, 663, 945
- *Veronica* sp., 837
- *V. arvensis*, 841
- *Verticillium albo-atrum*, 532
- *V. dahliae*, 532
- *V.* wilt of cotton, 590
- Vetch, 1155
- Viability
  - of lupin seed, 535
  - of oat and wheat seed, 41
  - of seeds, 241, 317, 1209
  - test for maize seed, 56
- *Vicia* spp., 1155, 1190
  - drought resistance, 112
  - frost resistance, 112
  - sowing dates, 112
- *V. atropurpurea*, 112
- *V. disperma*, 112
- *V. faba*
  - catalase activity, 242
  - chemical composition, 571
  - critical energy, 242
  - *Orobanche crenata*, 415
  - oxydase activity, 119
  - seed composition and water supply, 240
  - shoot development, 1059
  - symbiosis with *Bacterium radicicola*, 119
  - translocation of 2,4-D, 1057
  - water consumption, 248
- *V. hirsuta*, 511, 837, 839
- *V. sativa*, 837, 839, 1192, 1237
  - var. *gaudin*, 112
  - var. *hyemalis*, 112
  - var. *obvata* as cover crop, 646
  - var. *primavera*, 112
- *V. segetalis*, 837
- *V. tetrasperma*, 839
- *V. unifuga*, 839
- *V. villosa*, 52, 112, 1237—see also Hairy vetch
- Vicinism in cotton, 794
- Victoria, rotations, 588
- Victoria, soil fertility, 588
- *Vigna catjang*, 204
- *V. sinensis*, 1122—see also Cowpea
- Viruses and plant metabolism, 596
- Virus of sunflowers, 1100
- Virus yellows
  - of mangold 430, 1064
  - of sugar beet, 430, 431, 768, 1064, 1065
- Visual estimation of mineral deficiencies, 471
- Vitaceae, 378
- Vitamin(s), 1200
- Vitamin B complex in cereals, 623
- Vitamin C
  - and respiration, 878
  - biosynthesis during germination, 534
  - in broad bean radicle tip, 879
  - in plants, 530
- Vivifex, 385
- *Voandzeia subterranea*, 612
- Volunteer barley, 845
- Wales, marginal land survey, 589
- Water and cotton, 1072
- Water and germination of wheat, 28, 589
- Water balance of rice, 612
- Water conservation and cover crops, 279
- Water consumption
  - of groundnut, 248
  - of *Phaseolus vulgaris*, 248
  - of rice, 73
  - of *Vicia faba*, 248
- Water hyacinth, 378, 497, 498, 834, 836
  - germination, 1131
- Water management in Senegal, 817
- Water regime, auxins, and plant growth, 545
- Water requirements
  - of barley, 44
  - of wheat, 44
- Water, sugar and dry matter relationships in sugar beet, 132
- Water supply
  - and root growth, 880
  - and stem and seed composition, 240
- Water treatment of growing rice, 267
- Water usage and sand drifts, 591
- Water weevils of rice, 383
- Wax content of flax, 624
- Weather and crops, 907
- Weed-no-more, 1151
- Weedone, 216, 511, 1156, 1171
- Weedone 40, 221
- Weeds, 604, 1126, 1235, 1236, 1244—see also individual species
  - *Acanthospermum hispidum*, 1128
  - aerial spraying, in Israel, 509
  - alligator weed, 497
  - *Alysicarpus*, 599
  - *Amaranthus hybridus* var. *quitensis*, 1151
  - *A. retroflexus*, 1147
  - *A. spinosus*, 355
  - *Anthemis*, 509
  - *Asclepias syriaca*, 1147
  - *Atriplex*, 1247
  - *Avena fatua*, 495, 830
  - Bathurst burr, 591
  - bindweed, 509
  - blackberry, 591
  - bladderwort, 836
  - *Brachiaria* spp., 1147
  - butterprint, 842
  - Canada thistle, 627
  - *Cassia*, 599
  - cereals and selective herbicides, 499, 503
  - *Chara gymnopitys*, 836
  - charlock, 509, 1160, 1246
  - chemical control, 499, 510, 599, 621
  - *Chenopodium album*, 514, 1163
  - *C. zobelii*, 1151
  - *Chrysanthemum*, 504, 1246
  - *Cirsium arvense*, 514
  - classification, 512
  - coarse water grass, 836
  - coltsweed, 355
  - control, 23, 85, 212, 213, 214, 215, 216, 217, 219, 220, 221, 225, 226, 227, 271, 275, 276, 279, 280, 281, 378, 514, 592, 625, 924, 926, 928
    - equipment, 1173
    - by growth substances, 1127
  - *Convolvulus* spp., 355, 504, 1246
  - corn cockle, 831
  - couch grass, 832, 1129, 1233
  - crabgrass, 513, 833, 1133, 1163, 1166
  - crowfoot grass, 1136
  - *Cynodon dactylon*, 1130, 1147
  - *Cyperus rotundus*, 1147
  - *Datura ferox*, 1151
  - *Digitaria* spp., 1147
  - docks, 1155
  - *Echinochloa colona*, 1157
  - *Emex*, 504
  - *Enhydrias angustipetala*, 836
  - *Erysatorium*, 599
  - *Fumaria*, 504, 1246
  - *Galeopsis* spp., 835, 1247
  - *Galium* spp., 1246
  - galvanized burr, 591
  - germination, 840, 841
  - giant ragweed, 842
  - *Gleichenia*, 836

  grasses, 599
  hairy thorn apple, 496
  hoary cress, 591, 1132, 1233
  in Argentina, 1141
  in barley, 675
  in cereals, 501, 1155, 1246, 1247
  in cotton, 619, 1144, 1145, 1146, 1147, 1148
  in flax, 462, 508, 1232
  in legumes, 1149
  in linseed, 508
  in maize, 507, 618, 838, 932, 1150, 1151, 1152, 1153, 1154, 1155
  in Malaya, 836
  in oats, 507
  in peas, 414, 752
  in rice, 173, 598, 619, 717, 836, 1156, 1161, 1237
  in soyabeans, 507, 1133
  in wheat, 500, 503, 511, 837
  Johnson grass, 1133, 1134, 1142, 1161, 1237
  lalang, 836
  leafy spurge, 1233
  leguminous seed, 839
  Lepidium draba, 514
  Linaria, 504
  Malva spp., 1160
  Melastoma malabathricum, 836
  Mexican weed, 1161
  Mimosa pudica, 836
  mintweed, 591
  mistletoe, 591
  nutgrass, 356, 591, 836, 1133, 1135, 1136, 1142
  Oxalis sp., 1160
  perennial broad-leaf vine, 1147
  Portula oleracea, 1147
  pre-emergence control, 1144
  Prosopis spp., 509
  purple thorn apple, 496
  quack grass, 623, 928, 1138
  rabbit weed, 355
  Raphanus, 504
  R. raphanistrum, 514, 1162, 1247
  recurved thorn apple, 496
  redroot pigweed, 1163
  Rumex, 504
  Russian knapweed, 627
  ryegrass, 845, 1160
  saw palmetto, 1137
  Scirpus mucronatus, 1156
  seed weights and measures, 229
  selective control, 222
  Serbania, 599
  Silene, 504
  Sinapis alba, 514
  S. arvense, 1162
  skeleton weed, 591
  Solanum spp.,1147
  Sonchus spp., 1161
  Sorghum halepense, 1147
  spurry, 835
  Striga, 1016
  S. hermonthica, 1139
  Tagetes minuta, 1151
  teaweed, 1147
  thistle, 509
  toad flax, 1140
  Umbelliferae, 1162
  vetch, 1155
  volunteer barley, 845
  water hyacinth, 497, 498, 834, 836, 1131
  white top, 627
  wild carrot, 509
  wild oats, 845, 973, 1160, 1233
  wild winter pea, 1155
  witchweed, 920
  Xanthium americanum, 1147
  X. strumarium, 599
Weevil, 58, 278
Weights of weed seeds, 229
West Australia, Kimberley Res. Sta. Prog. Rep. 1947-9, 593
West Indies, agricultural development, 1257
Wet soils, 566
Wheat, 178
  after chickpea, 646
  after lespedeza, 620
  after maize, 622
  after summer fallow, 622
  altitude and behaviour, 323
  ancient Egyptian, 741
  and BHC, 250, 562
  and continuous light, 961
  and growth substances, 1200
  and hormone herbicides, 224
  and nitrogen, 324, 595, 963
  and phosphate, 595, 622
  and 2,4-D, 844, 1159
  aneurin content, 522
  anti-auxins and root growth, 660
  as cover crop, 2
  Asiatic varieties, 561, 652
  autumn sowing, 195
  auxin and root growth, 660
  black stem rust, 622
  bluegrass billbug, 319
  bran baits, 63, 64
  breeding, 6, 327, 622
  brown rust, 1246
  bunt, 953, 1232
  carbohydrates in leaf, 234
  carbonic anhydrase content, 237
  carotene content, 1189
  catalase activity, 242
  cell metabolism and auxins, 660
  cold resistance, 643
  composition, 959
  corn cockle, 831
  costs, 599, 1119
  covered smut, 671
  critical energy, 242
  critical moisture potential, 589
  cross with *Agropyron*, 308
  cultivation, 281, 298, 622
  deep ploughing and germination, 824
  deep root requirements in S. Italy, 27
  degeneration, 24
  depressing effect of herbicides, 216
  depth of moist soil, and yields, 1233
  determination of varietal purity by staining, 654
  development, 8
  disease resistance, 18, 320, 930, 1237, 1255
  drought, 939
  drought resistance, 922
  drought resistance and 2,4-D, 557
  effect of light on protein and starch content, 25
  effect of rainfall and temperature, 294
  environment and development, 323
  Erysiphe graminis, 313
  estimation of nitrate requirements, 31
  ethylene and germination, 863
  eyespot control, 23
  fertilizer placement, 276
  fertilizers, 1, 23, 269, 293, 398, 621, 664, 736, 922, 964
  fluorescein, 922
  foot rot, 730
  forecasting yields, 939
  frost resistance, 945
  garlic extract and germination, 864
  germination, 951
  germination and seed treatment, 865
  gluten quality, 950
  green manures, 599
  growth after vernalization, 29
  growth and nitrogen absorption, 659
  hemicelluloses of straw, 876
  Hessian fly, 625, 930
  hill cultivation, 302
  hoary cress, 1132
  in Baškii, USSR, 645
  in Bolivia, 14
  in Finland, 944
  inhibition of seedling roots by weed extract, 560
  in Kansas, 1119
  in Lombardy, 633
  in North Africa, 473
  in Orange Free State, 182
  in rotation, 2, 173, 265, 293, 596
  in Russia, 630
  in Siberia, 297
  in S. Australia, 588
  in Tanganyika, 642
  in Uruguay, 948
  irrigation, 315
  irrigation and root development, 960
  isopropyl n-phenyl carbamate, 559
  leaf rust, 622, 625, 649, 930
  light sensitivity and seed treatment, 865
  lodging control, 23
  loose smut, 20, 318, 617, 643
  manuring, 645
  mechanical counting of seed, 257
  mercurial residues, on grain 19
  metabolism, 962
  minor elements, 595
  mixed cropping, 481
  molybdenum, 1184
  morphology, 957
  mosaic, 1234
  mottling, 595
  mound cultivation, 482
  mountain cultivation, 303
  multi-flowered spikelets, 346
  niacin, 734
  nitrate assimilation, 891
  nitrogen content, 658
  nitrogen in leaves, 235
  nutritive value of straw, 735
  on Australian salt land, 326
  onion extract and germination, 864
  pantothenic acid, 734
  phenolase in grain, 654
  phenoxyacetic acid, 559
  pH of nutrient solution, 862
  phosphorus content of grain, 958
  photoperiodism, 26, 662, 663
  powdery mildew, 649
  rainfall and yield, 923
  respiratory poisons, 891
  rootone and germination, 28
  root production, 247
  root rot, 730
  rotations, 626, 641, 664
  rotations, and yields, 627

salt and development, 857
seed-bed preparation, 620
seed grading, 316
seedling development after water treatment, 28
seedlings and 6-amino-undecane, 558
seed rate, 23, 643
seed treatment, 20, 335, 617, 655, 656, 671, 910, 1034, 1035, 1036, 1200
seed viability tests, 41
sensitivity to light, 539
smut, 321, 335
soaking seed in nutrient solution, 599
soil, yield and quality, 644
sowing date, 5, 7, 9, 10, 12, 13, 296, 297, 299, 318, 599, 641, 643, 645
sowing date and disease resistance, 18
sowing depth, 643
sparteine sulphate and respiration, 657
specific heat, 1224
spring, trials, 2
stem moth, 975
stem rust, 1255
storage pests, 596
stubble sowing, 293, 297
sulphuric acid sprays, 23
Syringopais temperatella, 509
take-all, 23, 591, 596
thiamin content, 658
three month (short cycle), 15
tillage, 300
Tilletia caries, 320
T. foetida, 320
T. tritici, 952
trials, 597
Triticum dicoccum, 741
T. dicoccum var. Khapli....922
T. durum, 930
  bunt, 656
  varieties
    Alonso....956
    Amoros....956
    Azizia....656
    Candeal Sel. La Previsión....11
    Cappelli....955
    Caravaca 1....956
    Caravaca 7....956
    Carleton....647
    Dauno....656
    Garigliano....656
    Golden Ball....647
    Guadiana....954
    Hedba....955
    Mindum....647
    (Mindum × Carleton) × (Heiti × Stewart)....647
    Pelissier....647
    Preto de Tavira....955
    Rusello G.G.7....656
    Ruso....956
    S.40....557
    Santa Coloma....956
    Sarogolla....656
    Senatore Capelli....656
    Stewart 221....647
    Timilia....656
    Valenciano....956
    1742 × Carleton^2....647
    (1742 × Carleton^2) × Pelissier 647
T. monococcum, 741
T. polinicum, 922
T. turgidum, 958
  var. Arouca....954
T. vavilovi, 922
2,4-D, 505, 506, 557, 559, 837
2,4,5-T, 505
tyrosinase in grain, 654
varieties, 5, 17, 279, 282, 283, 294, 304, 306, 312, 314, 469, 570, 594, 595, 596, 599, 612, 618, 627, 648, 651, 734, 918, 920, 958, 1234, 1247, 1248
  Acero....14
  Akbidaĭ 630....663
  Ak-Bugdaĭ....315
  Aljbidum 3700....644
  Anttila....944
  April Bearded....3
  Arnautka Nemerčanskaja....295
  Atlas strain, 50 and 66....649
  Atle....1, 2, 3, 313
  Australia....606
  Avanzi 8....656
  Balo Vale....606
  Barbado....954
  Bárbaro....955
  Baroota Wonda..650
  Beirão....954
  Bejense....955
  Bencubbin....650
  Bencubbin 48....4
  Benvenuto Inca....7, 9, 10, 12, 13
  Bersée....1, 3, 345
  Blackhawk....16
  Blétendre 1476....14
  Bordon....650
  Braemar Velvet....305
  Brolga....4
  Bronze....313, 940
  Buck Quequén....9, 10, 12
  Bungulla....326, 650, 658
  Butler....623
  C-224....946
  Cahn's 1833....313
  Cascade....927
  C.D.3296....268
  Celebration....650
  Centeio....954
  Ceres....605
  Chancellor....278
  Charter....650, 658
  Cheg 161 x 8842....8
  Cheyenne....949
  Ciro Menothi....14
  Clarkan....949
  Comanche....949
  Comandante Novaro....309
  Cornell 595....1232
  Coronation....268, 927
  Coronation 2....927
  CPH47....922
  Cross 7....641
  Curlew....4
  Da Piedade....954
  Dawson's Golden Chaff....268
  Desprez....325
  De S. Vicente....954
  Diamond....941
  Diamond II....313, 343, 940
  Dika....296
  Dolis-Puri....316
  DQ3(150)2Q....948
  Dundee....650
  Dundee 48....4
  Elvense....954
  Ergo....942
  Eroica....941
  Etythrospermum 1160....945
  Eureka....650
  Eureka 2....650
  Fairfield....1232
  Fedweb 1....650
  Fife Tuscan....641
  Florence....650
  Florence × College 3813....947
  Ford....650
  Fortunato....308
  Franc-Nord....964
  Frassineto....242
  Funo....308
  Fylgia....3, 313, 941
  Gabo....640, 650, 1246
  Galego Miudo....955
  Gentil....954
  Glenwari....650
  Gluten....942
  Gular....650
  Hansa....941
  Hen Gymro....918
  Holdfast....29, 325
  Hordeiforme 189....663
  Hybrid 46....45
  Ideal....15
  I-M-511....16
  Insignia....650
  Iohardi....16
  Ioturk....16
  Iowin....16
  Javelin 48....4
  Jubilégem....45
  Juliana....325
  Kanhard....662
  Karachi....606
  Kărn II....313, 940, 943
  Kawvale....16
  Kelek M-1....315
  Kendee....650
  Kenya sel. 117A....274
  Kenya sel. 294M7....274
  Kernel II....940
  Kharkov....268
  Kimmo....943
  Kizyl-Diža....315
  Klein Anniversario....948
  Klein Cometa....9, 12, 13, 948
  Klein Cóndor....10, 948
  Klein Exito....14
  Klein 31....662
  Koala....640, 650
  Komčatka....315
  Kooperatorka....542
  Kruger Bearded....274, 606
  Lawrence......947
  Ld. 303 (D.T.204)....1232
  Lin Calel....662
  Litoral Precoz....948
  Little Joss....325
  Luso 2740....954
  Luso 3478....954
  Lutescens 62....295, 644, 663
  Lutescens 479....644
  Lutescens 1163....643
  M5....311
  M-78....16
  M33A....653
  McMurachy's Selection....1232
  Magnet....650
  Magueija de Colmo Cheio....954
  Manitoba Hard No. 1....14
  Maquarie....305
  Mara....308
  Marmin....16

Marquis....14
Massaux No. 5....13
Matopo....274, 606
Melanopus....14
Melanopus 69....643, 663
Mentana....15, 24, 30, 242, 606, 653, 656, 878
Mentana 243....14
Meridonale 77....315
Meteor....3
Mida....622
Milturum 122....645
Milturum 321....644
Milturum 0321....945
Mindum....1232
Minter....16
N.59....1200
Nabawa....15
Nazareno Strampelli 1....653
Nazareno Strampelli 2....653
Newthatch....48
Nord Desprez....45
N.P.52....922
N.P. 165....557, 922
N.P. 710....922
0.10....308
Oberdan....955
Odesskaja 3....542
Odesskaja 13....643
Odin....942
Olaeta 1078....13
Pawnee....16, 335, 505, 883, 949
Petiblanco....948
Pirana....954
Progress....313
Punjab....606
Punjab, 8A....274, 606
Pusa 3....650
Pusa 4....650
Quaderna....15, 955
Quadrat....650
Quanah....1237
Ranee....650
Rapier 48....4
Red Bobs....926
Red Klein Corn....606
Regent....268, 926, 927
Ribatejano....954
Rideau....268
Ridit....1191
Ridley 48....4
Riete....323
Rival....622, 940
Roma....955
Rondine....310
Sabenero....274
Sado....954
Saratovskaja 062....857
Saunders....268, 307, 926
Scandia....325
Scimitar 48....4
Seewari 48....4
Seneca....930
Sinvalocho....948
Sinvalocho M.A.....10, 13
Solid Straw Tuscan....641
Solina....656
Solvete....941
S. Pastore....308
Standard....941
Steadfast....325
Strain a 3278....943
Strain a 3455....943
Sureño M.A.....8
Surhak Jubileĭnyĭ....652
Surhak 5688....652
Sutton....305
Svalöf's Diamond....943
Svalöf's Ella....313
Talberg....605
Tammi....943
Tenmarq....949
Tevere....323
Thatcher....268, 926
Thorne....625, 930
T.N.1016-4....623
Transmontano....954
Trento....656
Triumph....949
Turcikum 57....315
Ukrainka....542, 945
Uljanov....645
Varma....944
Vilmorin 27....964
Virtus....944
Waratah....650
Warigo....650
Weibull's Pondus.....313
Weibull's Standard....325
Weibull's 4099....313
Westar....949
White Klein....606
Wichita....949
Wit Klein Koren....274
Yalta...650
Yeoman....45
Zealand....650
38 M.A....1191
3352 WO(W)....948
vernalization, 29, 542, 661, 662, 663, 945
vitamin C and respiration, 878
water and germination, 28, 589
water requirements, 44
weeds, 23, 222, 500, 503, 504, 509, 511; 837
winter hardiness, 627
yellow rust, 1246
yields(s), 627, 728
  and rainfall, 588
  in South Australia, 592
White ants, 599
White clover, root production, 247
White grubs, 747
White mould of beans, 627
White mustard, 1107
White stalk borer, 920
White top, 627
Wild carrot, 509
Wild oats, 338, 845, 973, 1160, 1233
  manganese and grey speck, 589
  manganese deficiency, 973
  seed dormancy, 589
Wild winter pea, 1155
Wilt of cotton, 612, 785
Wimmera ryegrass, 326
Windbreaks, 492
Wind direction and aphis infestation of beans, 114
Winter corn, rabbit damage, 322
Winter hardiness of wheat, 627
Wireworms, 579, 1037
Witchweed, 920
W. Phygon, 932
W. Seedox, 932
Xanthium americanum, 1147
X. spinosum, 591
X. strumàrium, 599
Xanthomonas malvacearum, 147
X. translucens var. *cerealis*, 49
X. phaseoli, 1232
Xenon arc-discharge, 1208
Yam(s)—see *Dioscorea* spp.
  fertilizers, 1238
  in El Salvador, 1067
  spacing, 1067
  varieties, 612
    Agua....1067
    Barbados....1067
    Ceylán....1067
    Ceylán Morado....1067
    Florida....1067
    Guinea Blanco....1067
    Papa....1067
    Vino....1067
  yam beetle, 446
Yellow mustard, 832
Yellow rust of oats, 606
Yellow rust of wheat, 1246
Yellows of sugar beet, 271
Yellow virus of sugar beet, 130
Yellow wilt of sugar beet, 129
Yemen, agriculture, 181
Yield forecasting, maize, 361
Zea mays, 178—see also Maize
Zinc nutrition, 588